Why Marry?

An Economic Analysis of the Male Marriage Premium

by

Jennifer Joan Chalmers

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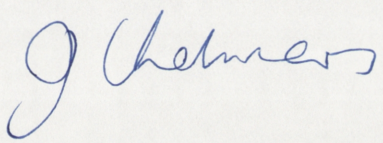
Declaration

This thesis was primarily written while I was studying at the Economics Department, Research School of Social Sciences at The Australian National University from 1993 to 1996. The opinions expressed are my own original work, unless otherwise acknowledged in the text or Acknowledgments.



Jennifer Chalmers

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Abstract

This thesis is an empirical investigation of whether traditional sex-based specialisation within marriage, wherein the wife takes responsibility for unpaid work in the home and the husband focuses on paid work, causes married men to earn more than unmarried men. The analysis is undertaken with three waves of Australian, Canadian and US cross-sectional data, spanning the 1980s and early 1990s.

The theoretical underpinning for the causal link between specialisation and men's wages is Becker's theory of the family (Becker, 1985). He views the family as a small firm; its members consuming what they produce from the combination of goods and services purchased in the market and their time. A motivation to specialise traditionally is that women, in general, are paid less than men.

Chapter Two reviews the predominantly US literature that has set out to uncover the cause of the marriage premium (see Gray, 1997 for a survey). Convinced that married men are more productive than unmarried men, recent analysis uses panel data to determine whether marriage makes men more productive or more productive men get married. The consensus is that specialisation played a role in determining the US marriage premium in the late 1970s, but Gray (1997) claims it played no role in the early 1990s.

I commenced the empirical analysis by estimating marriage premiums. The US premium was largest in every wave and the Australian premium smallest. Australia exhibits the least amount of sex-based pay discrimination. Between the first and third waves the sizes of the Canadian and Australian premiums shrank, but the US premium remained much the same size.

In the rest of the empirical analysis I assumed that wives' labour supply varied inversely with the couple's degree of specialisation.

In analysis presented in Chapter Five, the Juhn *et al.* technique was used to decompose dynamics (between the second and third waves) in the cross-country

wage gaps between never married men and currently married men (grouped by whether their wives worked full-time, worked part-time or did not work). Assuming that unobserved human capital was specialisation based this technique allowed me to identify cross-country and over-time differences in the amount of specialisation and the return to specialisation. Over the early 1990s the US marriage premium decreased in size. Consistent with this the amount of specialisation and the return to that specialisation also fell. Movements in the relative amounts of specialisation and return to specialisation explained the US-Australian dynamics, but could not explain the US-Canadian dynamics.

Finally, in Chapter Six I estimate a simultaneous model of wives' labour supply (measured by continuous hours of paid work) and husbands' wage using the third wave of data. I find that wives' hours were endogenous for Australian couples without dependents and Canadian and US couples, regardless of whether they were parents. With wives' labour supply endogenised I only found evidence of specialisation amongst couples with dependent children in each of the countries.

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CHAPTER ONE

INTRODUCTION

"Is your family wrecking your career?" asked Betsy Morris in a recent *Fortune* magazine cover story. "Once upon a time, a family was a corporate prerequisite", she continued. Having a wife and children was important to a man's career. However, "families are no longer a big plus for a corporation; they are a big problem" (Morris, 1997). She went on to identify the stresses associated with maintaining a career and family, especially when both a husband and wife are working in the paid labour market.

Married men tend to earn more than similar unmarried men. This empirical finding persists over time and across industrialised countries (Goldin, 1990; Schoeni 1990). One explanation for this earnings gap is that traditional sex based specialisation within marriage, whereby wives take responsibilities for work within the home (including child-care), allows men to devote more time and energy to their careers once married (Becker, 1985). Explicit in Becker's theory of the family is the belief that what goes on inside the family home impacts on the parents' productivity in the paid labour market.

Traditional specialisation within marriage is buoyed by discrimination against women in the paid labour market and contributes to the gender pay gap. Although men continue to earn more than women do in industrialised countries, we have experienced dramatic reductions in pay discrimination against women since the 1950s (Blau and Kahn, 1996a). Concurrently married women and mothers are increasingly likely to work in the paid labour market. For example, in Australia, the participation rate of married women rose from 29 per cent to just over 55 percent in the thirty years from 1966 to 1996 (Mitchell, 1998: 20). At the same time the size of the marriage premium received by American men has fallen over the 1970s and 1980s (Blackburn and Korenman, 1994; Gray, 1997). The marriage premium is the name given to the gap in earnings between married and unmarried men with similar holdings of observed human capital, such as education and work experience.

Despite the temptation to interpret these trends as indication of a causal relationship from specialisation, as measured by wives' labour supply, to husband's earnings, labour economists are not convinced that the male marriage premium is caused by specialisation. An alternative argument is that marriage does not make men more productive. Instead the men most likely to marry possess characteristics attractive to both prospective employers and prospective wives, like reliability and commitment. The most reliable and committed men will be more productive and most likely to select into marriage, hence its description as the selection hypothesis. A small literature has developed to determine the empirical importance of specialisation and selection as explanations for the male marriage premium (see Gray, 1997 for a review).

The primary intention of this thesis is to add to the specialisation versus selection debate. The focus of the thesis' empirical analysis is to determine the robustness of the specialisation hypothesis as an explanation for; cross-national differences in the size of male marriage premiums, and the dynamics of those cross-national differences. To this end I used three waves of cross section data from the Australian, Canadian and US data sets housed in the Luxembourg Income Study. Those waves spanned the 1980s and first half of the 1990s. Becker's theory of the family evolved to explain American family life in the 1960s and 1970s. Most empirical studies of the male marriage premium have been undertaken with US data from the 1970s and early 1980s. This thesis represents the first in depth cross-country analysis of the male marriage premium.

This test of the robustness of the specialisation hypothesis has important implications for women too. If the specialisation hypothesis holds, wives cannot expect to match their husbands' productivity in the paid labour market while having responsibility for work undertaken within the home. Despite wives' increased participation in the paid labour market, analysts of time-use data, such as Michael Bittman (cited in Bittman and Pixley, 1997), do not find an accompanying increase in work undertaken by husbands in the home. Rather, it seems that couples are consuming less home

produced goods, although working wives still spend substantial amounts of time in household work.

Analyses of the sex pay gap have paid explicit attention to the implications of the male marriage premium. Neumark (1988) noted that about one-third of the estimated sex-based pay discrimination in the USA was explained by the male marriage premium. Gregory *et al.'s* (1989) analysis shows that in Australia in 1981 the return to men's weekly earnings from having a spouse present was 17 per cent compared with 5 per cent for a female (19 per cent and 3 per cent respectively in USA 1982).

The countries under analysis are very similar. They each fall into Esping-Anderson's (1990) Anglo-Saxon or Anglo-American regime, having liberal welfare states. Hence this cross-national analysis can be described as a 'most similar' strategy (Przeworski and Teune, 1970). If able to locate a facet, in which otherwise similar countries differ, it can be attributed to one of the few distinguishing factors. In the period under scrutiny Australia had the most centralised wage determination process, and consequently the least amount of wage inequality. At the other extreme, in terms of wage inequality, lay the USA.

Theoretical explanations of the male marriage premium

Chapter Two introduces the current thinking about the male marriage premium. It surveys the theoretical explanations for the male marriage premium proposed by economists and summarises empirical evidence relating to the relevance of the theoretical explanations. The general consensus among economists is that married men are more productive than unmarried men are. Little empirical evidence has been found to support the theories that married men experience positive discrimination in the paid labour market or that married men take on more unpleasant jobs to receive earnings compensation, for example.

The predominantly US literature is preoccupied with determining whether married men are more productive before they marry, or whether marriage makes them more productive. The major innovation in recent years has been the use of panel data to

track men's earnings over time as they move in and out of marriage. Analysts use the panel data to isolate the effect of marriage on men's earnings from any life-long earnings differential unrelated to observed human capital. Most analysts have found that specialisation has played a role in determining the male marriage premium. Gray (1997) concludes that the reduction in the size of the US marriage premium over the 1980s was associated with a reduction in the importance of specialisation in the determination of men's wages.

Chapter Two also contains a discussion of the theory underlying specialisation, Becker's theory of the family. Becker's theoretical acknowledgment that work was also undertaken inside families enabled economists to turn their attention to the family. The family was constructed as a small firm producing goods and services, a combination of goods purchased from the market and the time of family members, valued by all members of the family. The family's utility, dependent on consumption of those home produced goods and services, was maximised by the household head, and himself constructed as 'benevolent dictator'.

Becker argued that, to maximise utility, a husband and wife should specialise in home production or work in the paid labour market and trade home produced goods and services for market purchased goods and services. Abstracting from gender power relations within the family and institutional pressures from outside the family, Becker's theory sheds no light on why women should have traditionally specialised in home production and men in market work. Indeed his side-lining of institutional and societal effects is the source of much criticism of his theory. Furthermore, Becker does not question the need for the specialisation in home production. In some households it is possible to employ someone at lower wages than can be earned by the wife, to produce household services. However, his theory shows how the relative wages of a husband and wife impinge on their specialisation decision, just as the specialisation decision affects their market wage outcomes.

The data: Australia 1981, 1989, 1994; Canada 1981, 1991, 1994; USA 1974, 1991, 1994.

Chapter Three summarises the data to be used in the more complex empirical analysis of the remaining chapters. The data surveys used were developed by the Luxembourg Income Study (LIS). LIS harmonises the data to make it suitable for cross-national analysis. Personal and wage and salary based income data for men and the wives of married men were extracted from the LIS data sets for each of the six surveys.

The population of men under analysis comprised males who worked for wages and salaries (not in the agricultural sector) aged from 20 to 65. When able to, I compared the wages of currently married men, including men in de-facto relationships, with those of never married men. Divorced, widowed and separated men were excluded from the analysis. The data was analysed on an income unit basis. The income unit, comprising a single male or couple with and without dependent children, was chosen because it corresponds to the relevant economic theories.

Preliminary analysis undertaken in Chapter Three compared the wage age profiles of unmarried men with those of married men grouped by whether their wife was working. According to the specialisation theory the wage gap between married and married men should grow with each year of marriage. Since the data surveys do not contain measures of years spent married I approximated this by the age of the male. The couple's degree of specialisation is assumed to be characterised by the age of married men, the wife's degree of attachment to the paid labour market, and the presence of dependent children.

Chapter Three sets out several hypotheses about the extent of specialisation in the countries under investigation and how cross-national differences in the extent of specialisation might have changed over the 1980s and early 1990s. Cross-national comparison was undertaken with the second wave of data sets since they enabled me to construct the most comparable samples and set of variables, Australia 1989, Canada 1991 and the USA 1991. Over time comparisons were made with the first

and third waves. Samples and variables were comparable over time within a country, but not between countries.

Despite the simple nature of this analysis it provided some interesting insights, suggesting, for example, the need to relax the assumption that wives' labour supply was a direct mapping of the degree of specialisation within the couple. It highlighted the importance of; isolating the amount of specialisation from the return to specialisation, and being alert to factors that might alter the amount of specialisation undertaken for a given labour supply. The focus of Chapter Five was to separate the return from specialisation related human capital from the amount of specialisation.

Specialisation and marriage premiums across countries and over time

Chapter Four presents a through unpacking of the marriage premium in each of the countries. Cross-country and over-time comparisons were made with the data sets outlined in Chapter Three. Marriage premiums were constructed from human capital theory based log hourly wage equations for men. Estimated by Ordinary Least Squares, the equations included controls for education, age, ethnicity, location and marital status. This analysis confirmed Schoeni's (1990) finding that the US marriage premiums were largest in size and the Australian premiums smallest in size. The marriage premium proves to be relatively important in the wage equations. For example, in Australia 1989 it represented twice the addition to the hourly wage than a male would receive from living in a capital city. Over time I found that the size of the marriage premium fell in Australia and Canada. The US premium was much the same size in 1979 and 1994.

Characterising specialisation as an increment to the return to age (where age proxies time spent married as well as work experience) I considered the extent to which the marriage premium was explained by differences in the return to age of married and unmarried men. I further decomposed the marriage premium by allowing it to vary with the wives' attachment to the paid labour market and investigated whether the presence of dependent children played a role.

This unravelling of the marriage premium produced some interesting results. The cross-country comparison suggested that, consistent with the specialisation hypothesis, human capital appeared to accrue over the course of the marriage. And married men with wives who worked in the paid labour market received lower premiums than other married men.

Over time it appeared that there had been a reduction in specialisation in Australia and Canada, evidenced by smaller differences in the returns to age of married and unmarried men, and smaller penalties for having a working wife. In fact there was no evidence of specialisation in the third wave of Australian data. While the US marriage premium was much the same size in the first and third waves the gap between the premiums of husbands with and without working wives had shrunk.

Unfortunately I was unable to determine over-time changes in the relationship between dependent children and the marriage premium. The chapter discusses the difficulties associated with formulating a hypothesis for over-time changes in the effect of dependent children on specialisation, and I was keen to see what the data could tell me. Data limitations in the first wave meant that divorced, widowed and separated men were coded as unmarried in the over time comparisons. Furthermore in the US first wave men in de-facto relationships were coded as unmarried. Hence the presence of children served primarily to identify those amongst the unmarried men who were in de-facto relationships or who had been married. Nonetheless, in estimations of the relationship between wives' labour supply and husband's earnings in the third wave of data sets, undertaken for Chapter Six, I grouped the couples by the presence of dependent children.

In chapters five and six specialisation was characterised by the wife's degree of attachment to the paid labour market. I was concerned that proxying the years of marriage by age was problematic given the trends to delay marriage, live in de-facto relationships rather than marry and the increased tendency to divorce and re-partner.

What does decomposing the dynamics of cross-country differences in the estimated wage equations for males grouped by degree of specialisation tell us about the relationship between specialisation and the male marriage premium?

Chapter Five begins by determining whether the male marriage premium varies with the wife's attachment to the paid labour market in the second and third waves of data. Here I was able to include men in de-facto relationships with men in de-jure marriages. I compared them with never married men. Estimation of log wage equations for males, including as an explanatory variable a set of three indicator variables for married men with; non-working wives, wives who work part-time, and wives who work full-time, suggested that the men with wives who did not work had the largest premiums, followed by men whose wives worked part-time and then men whose wives worked full-time. However the differences in the sizes of the premiums disaggregated by the wives' employment status were not always significant.

There is concern in the literature that wives' labour supply may be endogenous in the husband's earnings equation. It is possible that wives adjust desired hours of work in the paid labour market to their husband's earnings. The more a husband earns there is less financial need, from a family perspective, for a wife to work in the paid labour market. It is also possible that men and women sort into marriage on the basis of complementarity in their desire for a career. Both of these effects would appear as an inverse relationship between wives' hours and husband's earnings. I used the instrumental variables technique to test for the endogeneity of wives' labour supply. Unfortunately the instrument had difficulty predicting wives who worked part-time in Canada and the USA.

Cross-country comparison of the size of the marriage premiums grouped by employment status of the wives reveals that the US premiums are the largest and the Australian premiums the smallest. Over the early 1990s the size of each of the disaggregated marriage premiums fell in Canada and the USA, while only the Australian premium for men whose wives worked full-time reduced in size.

Using the Juhn *et al.* (1991; 1993) approach, I decomposed; the cross-country gap in estimated wage equations for males grouped by marital status and employment status of wives, and the cross-country differences in these gaps. The Juhn *et al.* approach allowed me to isolate that part of the cross-country differences in wages attributable to specialisation and the return to that specialisation. This approach to isolating the amount of specialisation from the return to specialisation is unique in the literature. Gray (1997) claims that any differences in the size of the effect of wives' labour supply on husband's earnings are attributable to differences in the return to specialisation. He assumes a fixed correspondence between the wives' labour supply and the extent of specialisation. This assumption is too strong for dynamic and cross-country analysis.

The decompositions showed that the US premium was the largest in size because US married males specialised more than Australian and Canadian males. The US return to specialisation was larger than the Australian return and much the same size as the Canadian return.

Over the early 1990s I found that the US premium fell in size because the return to specialisation related human capital fell, as did the amount of specialisation related human capital. Specialisation went somewhere towards explaining the dynamics of the US-Australian relative premiums but had little to say about the US-Canadian dynamics.

Modelling the relationship between the wages of married men and their wives' labour supply in more detail

Concerned about the adequacy of the test for the endogeneity of wives' labour supply undertaken for the analysis presented in Chapter Five, the focus of Chapter Six was to unravel the relationship between wives' hours of work in the paid labour market and husband's wages. Wives' labour supply was measured by continuous hours of paid work. It was anticipated that it would be easier to model continuous hours than the indicator variable of labour supply used in Chapter Five. Rather than forcing breaks in labour supply at pre-determined hours, the modelling process could do this itself.

Furthermore couples were grouped into those with dependent children and those without. The nature of the household decision making process within families is often assumed to depend on the presence of children. So it is also possible that the mechanics of the specialisation decision also differs with the presence of children. Taking care of children is a demanding and time-consuming task that makes the need to specialise all the more pressing.

A model is developed to describe the effect of the wives' labour supply on husbands' wages, and vice versa. It contains structural equations for the husband's wage and the number of hours worked by the wife and reduced form equations for the wife's potential wage (which feeds into the wife's hours equation) and the husband's hours. The wife's hours equation is estimated by the Tobit procedure while all other equations are estimated by OLS.

Estimation of the model is undertaken using the instrumental variables technique whereby the predicted wage of the husband, from reduced form estimation of the married male's wage equation, is included as a regressor in the wife's hours equation. Similarly the predicted hours of the wife, from estimation of the reduced form wife's hours equation, are included as a regressor in the husband's wage equation.

The results of estimation using the data sets from the most recent wave, confirm that increases in a husband's wage encourage his wife to decrease the hours she works in the paid labour market for all Canadian and US couples and Australian couples with dependents. However the male wage proves to be endogenous, suggesting that couples exhibit assortative mating in attributes which jointly increase the husband's wage and the wife's attachment to the paid labour market. Once endogenisation is accounted for the negative impact of increases in the husband's wage on his wife's hours increases.

Estimation of the male wage equation shows that the wife's labour supply, in its exogenous form, is inversely related to the husband's wage for all couples. However the wives' labour supply is endogenous for both sets of US and Canadian couples and Australian couples without dependents. Once the endogeneity was accounted for,

only couples with dependents exhibited specialisation. In couples with dependents, in which the wife works full-time for 35 hours per week, her decision to increase her desired hours of work by 10 percent, causes her husband's annual earnings to fall by $Aus166, $Can270 and $US187 in Australia, Canada and the USA respectively.

CHAPTER TWO

EXPLAINING THE MALE MARRIAGE PREMIUM

2.1 Introduction

The notion of the male marriage premium emerged from empirical observations that including a dummy variable for marriage in human capital theory based earnings equations for men improved the explanatory power of the model. Human capital theory itself provides no basis for the marriage premium, so theoretical justifications for its existence post-dated the empirical findings. The theories tend to be drawn from observations, within economics, of the machinations of the labour market and married couple relations in the US in the late 1970's and early 1980's.

This chapter introduces the theoretical justifications for the male marriage premium focussing on the proposition of interest in this thesis - that marriage raises male productivity through traditional sex based specialisation. I summarise the main empirical findings on the source of the male marriage. Much of the empirical analysis surrounding the marriage premium has concentrated on distinguishing between two theories, both of which build on the presumption that married men are more productive than are unmarried men. The specialisation hypothesis rests on the assumption that marriage increases men's productivity in the paid labour market while the selection hypothesis claims that men are selected into marriage on the basis of their labour market productivity. To differentiate between the two theories analysts tend to use longitudinal data, data that is unavailable in Australia. Rather than pose one theory against the other, this thesis rigorously tests the claims of the specialisation theory.

Section 2.2 briefly outlines the economic theories of the male marriage premium, focusing on specialisation. Section 2.3 discusses in some detail the theoretical source of specialisation, Gary Becker's theory of the family. Although this approach does not claim to explain the ultimate source of sex based specialisation within couples, it shows how the sex based differences in comparative advantage

can reinforce sex based specialisation and how they feed through to labour market outcomes. This approach assumes that, acting as a benevolent dictator, the head of the family maximise his utility. By so doing the utility of each and every family member is also maximised. This section also includes a brief critique of Becker's model of household behaviour.

In section 2.4 I use the empirical findings of others to show that, amongst other things, the male marriage premium has existed for some time in the USA and that the premium is not only a US phenomenon. I also illustrate why researchers currently believe that the two most likely explanations for the premium are specialisation and selection into marriage, both based on the belief that married men are more productive than single men. Also summarised, is the current debate about the relative importance of specialisation and selection as explanations of the marriage premium.

In much of the empirical analysis presented in this thesis the extent of specialisation within the couple is approximated by the wife's degree of attachment to the paid labour market. Section 2.5 is a discussion of the appropriateness of this assumption. Section 2.6 concludes.

2.2 Economic Theories of the Male Marriage Premium

This section outlines the main economic explanations of the male marriage premium; specialisation, selection into marriage, wife's investment, perceived need, compensating wage differentials and discrimination[1]. Each explanation relates to either the demand side or the supply side of the labour market. Suppose male wages follow the linear model:

$$\mathbf{w_i} = \alpha_0 + \alpha_1 \mathbf{Mar_i} + \alpha_2 \mathbf{X_i} + \alpha_3 \mathbf{A_i} + \varepsilon_i \qquad \textbf{(2.1)}$$

[1] Daniel (1995) notes that there are some features of marriage that could tend to lower not raise, wages. For example, he suggests that it is more difficult for a married man to change jobs for career advancement when doing so requires physical relocation of his family. In the same vein Daniel also claims that employers have the opportunity to exploit the relative immobility of married men by paying them a smaller share of the return to their firm-specific human capital.

where w is the (log) wage; Mar_i is a marital status dummy set to one if the male is married; X_i is a vector of observable wage-related (productivity related) characteristics; A_i is a vector of productivity related characteristics, related to marital status (Mar) and the wage (w) but unrelated to X_i; and ε_i is an error term. A_i may be observable to employers, the male and/or (potential) spouses, but is unobservable to empirical researchers.

As Blackburn and Korenman (1994) explain, the supply side theories rely on the idea that the marital status effect in the conventional wage equation reflects the higher unobserved productivity of married men in general. In terms of econometric theory estimates of the wage equation omit a variable that describes an element of productivity, A. Married men tend to have more of this element of productivity; so there is correlation between the omitted productivity and the married indicator variable. Marital status is endogenous. Eestimation of equation 2.1 by OLS leads to inconsistent estimates of α_1. Mar is related to the error term since A is related to the error term, being a factor that directly affects wages but is not included in the analysis.

The demand side explanations assume that marital status has a direct effect on wages that commences on the day of marriage. Hence A_i does not exist and Ordinary Least Squares (OLS) regression coefficient estimates from equation 2.1 are unbiased.

Supply side explanations

Specialisation

According to this theory marriage allows male workers to be more productive in the paid labour market (Becker, 1981, 1985; Kenny, 1983; Greenhalgh 1980). Becker (1985) provides a useful summary of the parts of his theory of family relations relevant to the link between sex specialisation in marriage and the husbands' productivity enhancement. Becker conceptualises marriage as analogous to a firm producing output valued by both the husband and the wife. Just as two countries producing the two same goods can benefit from specialisation in production and trade, the husband and wife (who may be

identical in their wage earning ability) benefit from specialisation in activities and trade.

Becker extended the neoclassical paradigm to add time to the resource constraint faced by households. Crucial to there being any benefit from specialisation and trade is Becker's assumption that there are increasing returns to total time allocated to a specific activity[2]. Earnings from a specific job or the output produced in a specific home based activity, Becker argues, increase proportionately with the product of the time spent in that activity and the time spent accruing human capital relevant to that activity. Earnings (productivity in the paid labour market), or output from a home based activity, is maximised when the time spent working in that activity equals the time spent accruing human capital specific to the job or activity, and when all one's time is spent in just one activity.

Furthermore, Becker (1985) argued that a husband and wife, identical in characteristics associated with their wage earning ability and working the same number of hours in the paid labour market, could benefit from specialisation. An individual's productivity in a task or job depends on the number of other activities undertaken and the type of activities undertaken, as well as the length of time spent in those activities. Individuals have limited energy and work, both at home and in the paid labour market, needs and use up different amounts of energy. The husband could be more productive in the paid labour market than the wife if she exerted more energy on home based work than he did. Even if the husband and wife both spent time working at home, she could exert more energy at home by spending more time on the same activities. Or she could take responsibility for the more energy intensive activities like child-care.

Becker (1981: 21-25) argued that husbands tended to specialise in paid market work and wives in home production because women had a comparative advantage in home production, especially the care of children. Following criticism of this biological essentialism based claim, Becker (1985) explained that his theory of the

[2] This is due to the independence between the cost of accumulating human capital and the amount of time spent using that capital.

relationship between specialisation and labour market outcomes could not be used to explain the existence of sex based specialisation within marriage. However, he asserted that, given the current tendency for women to specialise in home production, his theory explains a motivation for the magnification of sex based specialisation within marriage.

Specialisation models suggest that α_1 is biased upward because unmeasured human capital characteristics cause A and M to be positively correlated. The marriage premium literature argues that A increases with years married. It has found a quadratic relationship (for example Blackburn and Korenman, 1994; Korenman and Neumark, 1991; Gray, 1997). This finding fits with Becker (1985) since investment in specialisation related human capital is akin to on-the-job investment.

Selection into marriage

Causality does not necessarily proceed from marital status to earnings, as it does in the specialisation hypothesis. Some analysts have theorised that men with unobserved productivity are more likely to get married because the same desirable and unmeasured characteristics that lead to higher earnings also increase the probability of a male worker being married (Becker, 1981; Kenny, 1983; Cohen and Haberfield, 1991). Cornwell and Rupert (1995: 10-11) suggest that some of those characteristics might be honesty, loyalty, dependability and determination.

Selection models suggest that α_1 in equation 2.1 is biased upward because of the omission of A, since individuals with wage enhancing characteristics are more likely to be married. A is a fixed factor not directly affected by marriage, but related to it. Men will hold different amounts of A and the more of A a man has the more likely he is to be married.

Wife's investment

This differs from specialisation in a subtle but important way. Whereas specialisation is about the husband being allowed to specialise in work related activities because the wife specialises in home based activities, the wife's

investment theory argues that the wife undertakes activities that will directly increase her husband's wage earning ability.

It could be argued that specialisation and wives' investment are different names for the same things, since wives who invest in their husbands' careers may be more likely to be specialised. But the wives best placed to assist their husband's career directly will probably be those with the most experience in the paid labour market. On the other hand women most likely to specialise would tend to be the least experienced in the paid labour market.

The activities in the home that married women tend to specialise in often lead to, as Grossbard-Schechtman (1993) explains, improvements in human capital; for instance, through better nutrition and physical or mental health. Indirect evidence for such an investment process has been found in the effect of wife's schooling on husband's earnings by Benham (1974) and health (Grossman 1976), that is the more educated the wife the higher is the husband's earnings, both directly and via his health.

A wife might also augment her husband's productivity by assisting her husband in his work. For example she may act as a 'sounding board', or organise work-related activities. Hertz's (1986) study of dual career marriages described the advantages accruing to professionals married to other professionals. Epstein's (1971) study of lawyers provided examples of the ability of one spouse to augment the other's productivity. Pfeffer and Ross (1982) suggested that wives can contribute to their husband's career by providing advice and emotional support or building social relations that all combine to improve the husband's standing with superiors.

Demand side

Perceived Need

This explanation theorises that employers pay married male workers more because such workers need to support a family. Pay scales often reflect such a policy (Bartlett and Callahan, 1984). Australia's experience is a case in point,

> Australia was one of the few countries to institutionalise the concept of the 'family wage' (though it was widespread in most English-speaking countries). In 1907, Justice Higgins, Chair of the First Commonwealth Court of Conciliation and Arbitration, handed down his famous Harvester Judgement which effectively established the idea of the family wage to be set by arbitration rather than the 'unequal' contest on the labour market ... The family wage was conceived as a minimum or living wage sufficient for a man to support himself, his wife and children in 'frugal comfort'. (Bittman and Pixley, 1997: 215)

Female public servants were barred from working once they married. Male workers were also protected from female competition by general agreements that female wages could not be less than half the male 'family' wage, and only equal to it where women worked in 'men's work' (Ryan and Conlan, 1975: 90-103).

Gregory and Daly (1990) explain how the institutionalised family wage was eroded. Important changes included the Conciliation and Arbitration Commission ruling for equal pay for men and women in 1969 and, in 1986, the federal government passing Equal Employment Opportunity/Affirmative Action legislation.

Statistical discrimination

According to this theory employers discriminate against single men and married women because of past statistics relating average productivity and marital status (Siebert and Sloane, 1981). Pfeffer and Ross (1982) suggested that married men might be better rewarded because they conform to social expectations that men should be married and support their families. Since unmarried men differ from the social "norm" they are penalised.

Compensating wage differentials

Workers receive compensation in many forms, for example money, quality of work environment and the nature of the work itself. If, economic theory argues, non-monetary features of a job make it more unpleasant than the average job workers in that job will receive higher wages as compensation. Reed and Harford (1989) argued that married men might be more willing than single men to trade pleasant work for higher wages, motivated by financial need.

2.3 The Source of Specialisation: Becker's Theory of the Family

According to Oppenheimer (1997) Becker's specialisation theory was a relatively recent addition to the long tradition in the social science literature emphasizing the importance of differentiated sex roles for marriage stability and social integration. Both marriage partners gain from mutual dependence, trading the fruits of specialisation in particular roles.

Becker's view of the family

Integral to Becker's theory of the family (for example Becker, 1965; 1974; 1981; 1985), was his conceptualisation of the family as a site of production. Becker extended microeconomic theory to encompass a slice of the world previously beyond the reach of economists, thus making it easier for economists and other social scientists to formulate testable hypotheses about families. Hannan (1982) and Ben-Porath (1982), in their commentaries on the release of Becker's (1981) *A Treatise on the Family*[3], both mentioned the pressing need to make it easier for economists to conceptualise what was happening in families, because of what Hannan called the 'perceived crisis in the family' (Hannan, 1982: 65). It seems that within the economics profession Becker's theory of the family was regarded as timely and welcome. The demography of family life had changed greatly over the 1950s, 1960s and 1970s in all western societies. For example, the average age at marriage had increased, divorce had increased and birth rates had fallen sharply. One response to this perceived crisis in the family was the flood of new empirical data, like the US panel surveys.

Becker's primary innovation was the introduction of time into the resource constraint faced by households. As Ben-Porath (1982) and Hannan (1982) explained, Becker adhered strictly to the standard micro-economic analysis of household behaviour. His theory was based on the maximisation of stable utility functions, implying fixed underlying preferences, and assumed equilibrium. He

[3] *A Treatise on the Family* (Becker, 1981). This book was a compendium of Becker's writing over the previous years.

conceptualised the family as the site of production of goods and services such as conversation, quantity and quality of children, quality of meals, love and health status (Becker, 1974: 301, 320)[4]. These goods and services are produced from the combination of productive activity within the home, activity that takes time, and goods and services purchased in the market. The family maximises the consumption of these goods and services given time and income constraints. Schultz (1974) explained Becker's view of the family as one that encompassed both consumer choice and household production decisions.

According to Hannan (1982), Becker derived the motivation for the traditional sex based division of labour between husbands and wives by applying the theory of comparative advantage to the allocation of productive activity within the household. Within Becker's theory the consequence of even small differences in production capacities result in very different allocations of time to market work and work within the home in equilibrium. The assumption of increasing returns to scale in production means that one will specialise completely in market work and the other in household production. Specialisation (and trade) is advantageous because the family is assumed to pool resources and transfer resources within the family. In a sense the husband and wife behave like barterers. They are considered to have a double coincidence of wants. In contrast we work for money in the paid labour market because that only requires a single coincidence of wants.

Becker's departure from standard neoclassical economics arises because family utility, rather than individual utility, is maximised. To overcome this problem he assumed that the head of the family maximises his utility, but his utility reflects family utility. The family head is considered to be altruistic, so that by maximising his utility he does the best thing by the other members of the family. Becker even argues that the children in the family can act selfishly, and the family still ends up in the ideal position for all.

[4] Cigno (1991) assumes in his analysis of division of work within the family that both the husband and wife should be involved in household production of joint goods like companionship, familiarity, love and children. This rules out the possibility that either of the spouses specialise completely in the market. But his model does not rule out the possibility that the spouse with the lower wage specialises completely in household production.

Feminist economists, such as Gardiner (1993) point out that the specialisation and trade approach rests crucially on the presumption that skills and expertise developed within the household are not transferable to the paid labour market. Furthermore, Oppenheimer (1997) argues that extreme sex-role specialisation within marriage can be a high-risk and inflexible family strategy. For example, the temporary or permanent loss of one specialist can mean that functions vital to the well being of the complementary specialist and children are not undertaken. Two employed spouses buffer households against economic uncertainty, job loss and financial strain.

Folbre (1986) explained that Becker resorted to the concept of the benevolent dictator to rationalise the fact that individuals do not "free ride" on the benevolence of others inside their family. The household head uses his economic power to ensure that every family member acts in the interest of the family as a whole. Those with power in the household are altruists. Only the children, who are powerless in the family decision-making process, can behave selfishly. The assumption that altruism dominates actions within the family has been questioned by Folbre and Hartmann (1988) and England (1993). Furthermore, Berk and Berk (1983) explain that this model of altruism requires that the altruist have complete and accurate information about each member's on-going welfare. They noted that altruism might have been a genuine alternative to individual utility maximisation, but that it was a relatively new concept theoretically.

Until Becker's revolutionary conceptualisation of the family, economic theory had focused on the market economy and regarded the family as a passive object. Sociologists, Bittman and Pixley (1997) and Berk (1985), stress the value of this theoretical recognition that the household produces valuable goods and services that never reach the market. In the industrialised era women have primarily undertaken this work, and hence their role within economic theory had been reduced to one of passivity.

Becker's acknowledgment that work was also undertaken in the home had sizeable implications for the neoclassical understanding of labour supply, especially the labour supply of women. Until Becker advanced his new theory the

labour supply decision was modelled as a choice between work in the paid labour market and leisure in the home. Becker introduced a third arm of the decision-making process: work within the home.

Initially Becker's theory of the family attempted to provide an economic theoretical basis for the sex based division of labour within the family. Becker (1981: 21-25) suggested that men and women are intrinsically different in terms of their comparative advantages in the production of children, their contribution to childcare and other household work. This, he claimed, was the driving force behind sex based specialisation within marriage. The depiction of the sexual division of labour as a consequence of biological essentialism has received substantial criticism from feminist economists and other social scientists. Becker (1985: S41) acknowledges these criticisms, and their counter-argument that "exploitation" of women is a more important determinant of the sexual division of labour. Becker (1985) reminded these critics that his theoretical depiction of specialisation within marriage did not rely on there being a known source of the comparative advantage of women in household activities. It made no difference to the implications of his theory whether discrimination or other factors caused the comparative advantage.

However, this relegation of comparative advantage to exogeneity is problematic. Like neoclassical economics in general, Becker's theory ignores the roles of institutions and power relations within families, hence bypassing the need to adapt the theory to accommodate for example, institutional or societal change change. As Berk and Berk (1983) explain, the sexual division of household labour can also be explained by socialisation, arrangements of social institutions, or male domination. Economist Ben-Porath (1982) reminds us that Becker did not attempt a systematic treatment of the transition from traditional to modern types of family. Nor can his theory tell us what determines the economic functions and social roles of families compared with firms and governments. These are institutional questions. As a basis of a theoretical explanation of cross-country and over-time differences in the size of the male marriage premium, Becker's theory would benefit from easing the exogeneity assumption and allowing institutional and societal factors to play roles.

Hannan (1982: 70) claims that Becker understates and overstates the role of culture and institutional arrangements. They are understated because Becker denies that institutions have any independent effect on behaviour. They are overstated because the theory leaves moot the questions of origins, for example, the tendency for blacks and white Americans to differ in their tendency to invest in their offspring. As Hannan explains, it is important to know whether the ethnicity difference is due to different preferences, or because the structure of marriage markets, labour markets and other social arrangements differentially affect families by ethnicity. Hannan claims that any theory of the family should work towards the coupling of individual decision making and institutional change.

Folbre (1986) was concerned that the theory was silent on the issue of inequality within the home. She provides examples of inequality within households, many of which are along gender lines (Folbre, 1986: 248-249). These examples of inequality cast doubt on joint utility, but are not irreconcilable with it. They could be explained by "taste" for altruism or voluntary sacrifice by wives. Because altruism is taken as a given, any changes in the distribution of resources between family members can be attributed to changes in prices and income. The power differential between a husband and wife does not enter the debate. But if the wages of women rise relative to men it could be argued that so too would the bargaining power of women.

Competing theories within economics

There is a stream of economic literature concerned to break down the assumption of a unitary utility function for the family. Concerns that power relations within the family had been ignored prompted the development of the bargaining theory approach to family decision-making (for example, Manser and Brown, 1980; Horney and McElroy, 1988; Schultz, 1990). Alderman *et al.* (1995) identified two limitations of the unitary model. Firstly it allows prices to differ for the various household members (for example, the wife's wages and husband's wages) while assuming that household resources from wage earnings, for example, are pooled. This implies that at least one member of the household must be able to monitor the other members and sanction those who do not follow household rules.

Furthermore it fails to incorporate the process by which resources are distributed within the household.

The bargaining approaches closely resemble neoclassical theory in their emphasis on individual decision making. But, instead of family decisions being made by one person, the household head, they are the result of bargaining between the husband and wife. The objective functions of the husband and wife are different from the usual economic ones. The husband and wife maximise the product of their individual gains from marriage. The threat point is the individual's economic position outside marriage. Furthermore the objective functions are partially endogenised.

Household decisions are a function of relative economic bargaining power because the threat points are largely determined by the individual's potential economic position outside the household. But, the bargaining literature does not analyse the genesis, reproduction or modification of these inequalities in rigorous terms.

Some cooperative models impose structure by representing household decisions as the outcome of a specific bargaining process and applying the tools of game theory to this framework. Then the division of the gains from marriage depend on the "fall-back" or "threat point" position of each member. McElroy and Horney (1981), Horney and McElroy (1988) and Manser and Brown (1980) propose a cooperative Nash bargaining model of household behaviour. Each household member has a utility function and a threat point (maximum utility level if agreement is not reached). The greater the threat point, the more strongly that member's relative valuation of goods is reflected in the household demands. The definition of the threat point is still an open question. In McElroy and Horney (1981) the threat points are determined by the options outside the family, for example the assets of each partner. In this model changes in demand result not only from shifts in the budget constraint but also from changes in the objective function due to the relative changes in power.

Others, like Chiappori (1988), Apps and Rees (1994) and Apps (1994) approach the household decision making process from the perspective that household

members employ a sharing rule to distribute resources in a Pareto optimal way. Folbre (1986: 251) neatly describes the appeal of these models:

> The suggestion that women and female children "voluntarily relinquish leisure, education, and food would be somewhat more persuasive if they were in a position to demand their fair share. It is the juxtaposition of women's lack of economic power with the unequal allocation of household resources that lends the bargaining power [collective model] approach much of its persuasive appeal.

A few studies have attempted to empirically test the assumption of one decision-maker versus the more general bargaining framework. Kapteyn and Kooreman (1992) argue that on the basis of the data generally available for empirical tests (for example, household non-labour income and consumption and wages and hours worked by family members) the two theoretical approaches can not be compared. Since the data is collected as if the household is a homogeneous unit it is inadequate to test whether or not the household is homogeneous.

These models, known as cooperative solution models, assume, like the unitary models, that individuals form households when it is more beneficial to them than remaining alone. The underlying assumption common to them is that the household is a more efficient way to produce household goods and services and/or that some goods, like "love" and "companionship", can only be produced by couples.

In contrast, non-cooperative relations models, such as the one portrayed in Lundberg and Pollak (1993), assume that individuals cannot enter into binding and enforceable contracts with each other. Each spouse makes decisions in his/her own sphere and responds to the decisions of the other by altering his/her level of voluntary contribution to the shared goods.

This brief description of the alternative approaches to theorising the household highlight the analytical complexity associated with not viewing the household as a homogeneous decision making unit. In this thesis we take the view that the net gains from the additional insight achieved by modelling the individual utility of the husband and wife would be very small. We assume that specialisation is undertaken with the implicit agreement that the husband and wife, regardless of

the source of family income, share family income equally. Even if the outcome were an unequal sharing of income we would have to be satisfied that both husband and wife anticipated the unequal sharing when specialisation decisions were made.

Some empirical tests of specialisation theory: marriage, housework and earnings

A simplistic version of the specialisation hypothesis could focus on time, arguing that traditional sex-based specialisation in marriage is evidenced by the wife spending more time in household work than her husband, and her husband spending more time in paid work than her.

In terms of household production Bittman and Pixley (1997) reported evidence showing that the effect of marriage, at least for Australian men, reduced the amount of time they spend in cooking, cleaning and laundry activities. This suggests that married women take over at least some of their husband's housework responsibilities. Indeed Bittman and Pixley (1997) also found that married women spent more time cooking, cleaning and doing laundry than their unmarried counterparts did.

Hersch and Stratton (1994) modelled the total amount of time couples spent on housework and the division of that time between working spouses. Using US panel data from the PSID they found that the husband's share of housework time fell when he contributed a greater share of labour income. He decreased the amount of time he spent working at home and his wife increased the amount of time she spent working at home.

A number of studies have explored the direct effect of time spent in household labour and earnings. For men, the cross-section analysis that assumed housework was exogenous had mixed results. Using US data from the 1970s and 1980s, Coverman (1983), Chandler *et al.* (1994) and Hersch and Stratton (1997) estimated a negative relationship between the time married men spent in housework and their earnings. However, Shelton and Fireston (1988) and Hersch (1991a) found no relationship. Hersch and Stratton (1997) argued that the

conflicting findings were due to differences in the measurement of housework between the data sets. However they did not suggest which data would be more reliable. Hersch's (1991b) simultaneous equation estimates recognised that housework is jointly determined with wages. She found no evidence of a negative relationship. When Hersch and Stratton (1997) corrected for the endogeneity of housework using instrumental variables, the negative relationship between housework and men's earnings became insignificant. It also proved insignificant for their fixed effects estimates. The authors cast doubt on these findings, stating that they had not found an adequate instrument for housework for the instrumental variables technique and were anxious about the effect of low intra-personal variance in housework time on the measurement error of their fixed effects analysis.

Estimates of the effect of time spent in housework on the wages of wives were negative regardless of the data source or estimation approach (Hersch; 1991a, 1991b; Hersch and Stratton, 1993; Chandler *et al.* 1994).

2.4 Empirical Findings

Differences in the wages and/or annual earnings of married and unmarried males are well documented in the USA. In cross-sectional human capital based wage/earnings equations for males, with controls including at least education and labour market experience, the estimated male marriage premium[5] has ranged from four to 45 per cent. Empirical analysis of the source of the male marriage premium has focused on the relative importance of two supply-side theories, the specialisation and selection hypotheses. The empirical evidence generally favours the productivity enhancing or supply side theories. Discrimination in favour of married men is a difficult to prove hypothesis given the available data. To distinguish between the selection and specialisation hypotheses the studies

[5] This is the difference between the wages of currently married men (can also include de-facto couples) and never married men.

generally use longitudinal data to show when the increased productivity was first observed and/or whether marital status is related to unobserved characteristics that are constant over time and also correlated with their earnings. In terms of the timing question, a finding that extra productivity was observed before marriage supports the selection hypothesis while a finding that it occurred after marriage supports the selection hypothesis.

In this section I summarise the critical findings from the empirical studies. *Table 2.1* lists the major studies discussed in this sub-section, the samples they used and the age of the men. Age is crucial in an analysis of the effects of specialisation on wage outcomes. The effect of specialisation on the wages of married men is not instantaneous. Specialisation related human capital accrues over the life of the marriage, so it is important to ensure that the sample includes men, sufficiently old enough to have married and benefited from specialisation. Furthermore, since those that marry younger might differ from others in unobservable ways the sample should contain men who marry later rather than sooner. The ages of the sampled men in the empirical analysis undertaken with longitudinal data tend to be less than 40, suggesting that men who marry later may well be excluded from the analysis.

2.4.1 Is the marriage premium universal?

The marriage premium is not just a US phenomenon, although it varies in size across countries

The male marriage premium is not restricted to the USA. Schoeni (1990) found evidence of male marriage premiums in cross section data from the twelve industrialised countries then included in the Luxembourg Income Study[6]. He estimated premiums of between four per cent and 31 per cent for currently married men, compared with unmarried men, in annual earnings equations. Greenhalgh (1980) analysed cross sections of British workers for 1971 and 1975

[6] Those countries were Australia, Canada, France, West Germany, Italy, the Netherlands, Norway, Poland, Sweden, Switzerland, the United Kingdom and the USA.

and found premiums of between 10 and 14 percent. Siebert and Sloane (1981) surveyed three English establishments and estimated premiums for each, ranging from 11 to 27 percent. Duncan and Holmund (1983) found a premium in Swedish data from 1968 and 1974.

Table 2.1: Summary of major studies of source of male marriage premium

Study	Sample	Age of men
Hill (1979)	US Panel study of Income Dynamics (PSID) – 1976 wave	18-64
Kenny (1983)	US Coleman-Rossi Retrospective Life Histories Study – 1969	30-40
Bartlett and Callahan (1984)	US National Longitudinal Survey of Older Men (NLSOM) - 1977 wave	55-64
Korenman and Neumark (1991)	US National Longitudinal Survey of Young Men (NLS) - 1976, 1978, 1980 waves	24 – 34 in 1976 to 28 – 38 in 1980
Blackburn and Korenman (1994)	US March Current Population Survey – 1968 – 1989	26 – 53
	US Census – 1970, 1980	26 – 53
Cornwell and Rupert (1995)	NLS - 1971, 1976 waves	19 – 29 in 1971 to 24 – 34 in 1976
Loh (1996)	US National Longitudinal Survey of Youth (NLSY) – 1990 wave	25 - 32
Gray (1997)	NLS - 1976, 1978, 1980 waves	24 – 31 in 1976 to 28 – 35 in 1980
	NLSY - 1989, 1991, 1993 waves	24 – 31 in 1989 to 28 – 35 in 1993
Cornwell and Rupert (1997)	NLS - 1971, 1976, 1978, 1980 waves	19 – 29 in 1971 to 28 – 38 in 1980

The marriage premium is not time specific.

The premium is not restricted to the second half of the twentieth century. Goldin (1990) documented the US male marriage premium back to the nineteenth century. Loh's (1996) analysis of cross-section US census data from 1939, 1949, 1959, 1969 and 1979 found a premium for white men in each of the years. Loh did not find a sustained trend over time in the size of the premium. In 1939, 1949 and 1969 the premium was around 26 per cent. In 1959 and 1979 it was closer to 12 per cent.

Other analysts have confirmed that the size of the US premium has been falling in recent years. Using annual CPS data Blackburn and Korenman (1994) found that the size of the premium for white Americans fell by ten percentage points to 18.5 per cent over the period 1967 to 1988. Gray (1997) estimated that the premium fell from 11 per cent in the late 1970s to 6 per cent in the early 1990s.

Black Americans do not receive as large a premium as white Americans do

Many of the American studies have restricted their analysis to white Americans. Two studies that specifically considered whether white Americans received a different sized premium from black Americans are Loh (1996) and Blackburn and Korenman (1994). Loh's estimates of movements in the size of the US premium over time shows that the black premium was substantially smaller than the white premium in 1939 and 1949. From then on the black premium increased in size to be substantially bigger than the white premium in 1979. In contrast Blackburn and Korenman (1994) estimated that the black premium was slightly lower than the white premium from 1967 to 1988 and, like the white premium, the size of the black premium was trending lower with time.

Divorced and separated men tend to receive a lower premium than currently married men do

These studies consider currently married men apart from divorced and separated men. Widowed men were mostly excluded from the analyses. While divorced and separated men receive a premium it has tended to be smaller than the premium for currently married men. For example, Bartlett and Callahan (1984) found that married men earned 19.5 per cent more each year than divorced or widowed or separated males and 32 per cent more than unmarried men as a whole did. Hill (1979) estimated a premium of 34 per cent for currently married men and 31 per cent for widowed, divorced or separated men. Cornwell and Rupert's (1997) cross section premium for currently married men was 8.7 per cent compared with a premium of 6.6 per cent for divorced men. Gray's (1997) cross section premium for the late 1970s was 11 per cent and the premium for divorced or separated men was 10 per cent. In the early 1990s he found no premium for divorced and separated men.

Men with dependent children may or may not receive a larger premium

Korenman and Neumark (1991) and Cornwell and Rupert (1997) found, in cross-section analysis, that men with dependent children earned a higher premium than men without children did in the late 1970s. Cornwell's and Rupert estimated that children added 5.7 percentage points to the premium. In Cornwell's and Rupert's analysis the effect of dependents was robust. It remained about five percentage points when they used fixed effects estimation and even when they controlled for marriage duration. Korenman and Neumark's dependents effect was not as robust, becoming smaller and insignificant in their fixed effects regressions.

However, Loh (1996) using the 1990 wave of the NLSY, found that the presence of dependent children had no effect on the wages of married men. My analysis, presented in Chapter Four, supports Loh's findings for US men. It is also suggests that, when men in de-facto relationships and/or divorced, widowed and separated men are included in the unmarried category, the presence of children effect is a pseudo marriage premium since it identifies fathers caring for dependent children amongst unmarried men.

Women do not receive a marriage premium

A number of analyses of the relationship between marital status and women's wages using US and UK cross-section data suggested that married women tended to earn less than unmarried women did (Moore and Wilson, 1982; Goldin and Polachek, 1987; Greenhalgh, 1980 and Siebert and Sloane, 1981). However studies that used more accurate measures of work experience, such as Dolton and Makepeace (1987) and Hill (1979) found no relationship between the marital status and wages of women.

More recent analyses, using panel data from the US NLS, supported the finding that marital status had no effect on women's earnings. Kilbourne *et al.* (1994) focused on the experiences of people aged 14 to 24 in 1968 over the twelve years to 1980. Their analysis suggested that neither white women nor black women experienced a reduction in wages upon getting married. Korenman and Neumark (1992) reached the same conclusion using the 1980 and 1982 waves of the NLS.

2.4.2 Married men appear to be more productive than unmarried men

Researchers have reached a consensus that married men are more productive than unmarried men are. In general, the other hypothesised causes of the marriage premium, including discrimination and compensating wage differentials are now ignored.

Using payroll records for white male managers and professionals, from a large US manufacturing firm, Korenman and Neumark (1991) found that most of the return to marriage could be explained by the fact that married workers tended to be in higher paying job grades within the company. They did not receive higher pay for a given performance level within a job grade, as one would expect to see if they were being treated differently by employers. Marriage was associated with a substantially higher probability of promotion and a slightly lower probability of separation from the company. Married workers were more likely to win high performance ratings and higher performance ratings were positively related to their probability of promotion

Hill (1979) reported that married men spent more time in training on the current job than unmarried men did. Lynch's (1993) more detailed analysis of different types of private-sector training confirmed that married men received more on-the-job training than unmarried men did. Bartel and Sicherman (1993) also found that married men received more on-the-job training.

Daniel (1995) observed that the marriage premium declined as husbands neared divorce. Hersch (1991b) and Duncan and Holmund (1983) found little support for the theory that married men might be more willing to trade job attributes for higher pay.

2.4.3 The marriage premium is caused by specialisation and selection into marriage

Much of the recent literature has used panel data to distinguish between the two explanations for the extra productivity of married men, the selection and specialisation hypotheses. Two methods have been used. One approach is to determine the timing of the wage increase that accrues to married men. If specialisation is the cause the wage increase will occur once the man is married. If selection is the cause the wage increase will have taken place before marriage. Another approach is to compare the results of generalised least squared estimation (or "between" estimation) with those from fixed effects (or "within" estimation) to see whether marital status is correlated with unobserved characteristics of men that are constant over time and correlated with their wages. The fixed effects estimator applies OLS to data that has been transformed into deviations from individual means, and is consistent if the unobserved characteristics and marital status are correlated. Generalised least squares estimation is consistent if unobserved characteristics and marital status are uncorrelated. It only exploits the cross-section dimension of the panel and applies OLS to individual means. I call this cross-section analysis in the rest of this section. A researcher who finds a marriage premium in cross-section analysis that disappears in fixed-effects analysis could conclude that the marriage premium reflected selection into marriage, rather than specialisation. If the marriage premium exists in fixed effects analysis, but is smaller in size than the cross-section premium, selection into marriage and specialisation could be said to both play roles. The validity of the findings from the second approach relies on the assumption that the man's unobserved productivity, other than the component related to marriage, remains constant over his working life.

Another approach to controlling for the endogeneity of marriage is to model the process governing marital status. Two methods have been used, instrumental variables (IV) and the inverse Mills ratio. In the first method the probability of being married is estimated. The instrumental variable for marriage, the model's prediction, is purged of correlation with the unobserved characteristics. This

instrument enters earnings equations for men instead of observed marital status, and its estimated coefficient measures the effect of marriage on wages. The inverse Mills ratio approach corrects for the self-selection of men into marriage, accounting for differences between married men and unmarried men. The ratio appears as a regressor on the men's wage equation. Its significance tests for the exogeneity of marriage, and the estimated coefficient on observed marital status measures the effect of marriage on wages.

Another test is to compare the wives' degree of attachment to the paid labour market with her husband's earnings. Findings from analysis that used this approach are discussed in section 2.5.

The timing of the wage increase

Kenny (1983) used retrospective employment history data for a sample of 30-40 year old males surveyed in 1969. He calculated the average monthly rates of growth in hourly wages before and after marriage. Then he regressed the before and after marriage growth rates on the difference in average age between the two periods and on the gap in the average annual rate of growth of the general level of manufacturing wages between the two periods. The intercept was positive and significant suggesting that wage growth was higher in the married months. Kenny added controls for race, education, age at marriage, verbal ability and wife's education. He found none of these variables significant so concluded that the difference in the rate of increase in human capital between the married years and single years was unrelated to the initial stock of observed human capital.

Using the 1971 wave of panel data, Cornwell and Rupert (1997) defined an indicator variable "to-be-married". They set this to one for men who had married by 1980 (when they were aged 28-38). Then they estimated the effect of this dummy in a cross-section wage equation for all men in 1971 (aged 19-29), including the usual human capital control variables. They found that the wages of the men who married after 1971 were at least as high as those already married in 1971.

Cornwell's and Rupert's (1997) findings are in direct conflict with Kenny's (1983). I would be cautious of Cornwell and Rupert's results because they compare pre-marriage wages of one group of men with post-marriage wages of another group without acknowledging that the groups could represent very different men. It is possible that men who married by the age of 29 might be less career-oriented than men who married by the age of 38.

Nakosteen and Zimmer (1997) performed a more sophisticated analysis based on these principles. Using data from the 1979 wave of the PSID they estimated a standard earnings equation for unmarried men. They then estimated two probits for the likelihood of marriage by the 1982 wave and the 1984 wave. Predicted earnings and the standardised residual from the estimated earnings equation for single men in 1979 were included as regressors in the probits. They argued that the standardised residual reflected unobserved productivity. They found that in both probits the estimated ceofficients on the standardised earnings residual were positive and significant, suggesting that men who marry tend to hold higher levels of unobserved productivity prior to marriage. The authors concluded, however, that these findings were preliminary. They suggested that further analysis should model the marriage-earnings connection using a simultaneous equation approach that accounted for the joint occurrence of marital behaviour and other decisions like schooling.

Fixed effects analysis

Several fixed effects analyses of the same US panel data, the National Longitudinal Survey of Young Men (NLS), have been undertaken. The consensus view seems to be that both specialisation and selection contributed to the marriage premium in the late 1970s. Only Gray (1997) has analysed more recent panel data. He concluded that specialisation played no role in determining the marriage premium in the early 1990s.

Including years of marriage in the list of regressors in the men's wage equation, Korenman and Neumark (1991) found that the marriage premium increased with years of marriage. In cross section analysis for the late 1970s they estimated a marriage premium of 17 per cent at the mean years of marriage. They found that

80 to 90 per cent of the estimated cross-sectional impact of survived fixed-effects estimation.

Gray (1997) used the same data, except he restricted his cohort to men aged 14 to 21 in 1966. His findings corroborated Korenman and Neumark's (1991). He then undertook similar analysis on men of the same age in the early 1990s. He found that the marriage premium was washed out entirely by fixed-effects analysis, and that unobserved ability was correlated with men's accumulated years of marriage. Gray concluded that there had been such a large decline in the specialisation effect of marriage over the period that the productivity of married men was no longer increased through marriage. He argued that the selection into marriage process had changed dramatically in little over a decade. In the late 1970s, he claimed, men selected into marriage on the basis of unobserved ability that provided a one-off boost to their productivity. However men selected into marriage in the early 1990s on the basis of unobserved ability that added to their productivity in each year of marriage.

Cornwell and Rupert (1997) criticised the two previous studies because of the age of the men when sampled. Marital status changes represented a relatively small proportion of the late 1970s samples in both studies, only 25 per cent in the case of Korenman and Neumark (1991). More importantly, Cornwell and Rupert argued that because over 80 per cent of those who changed marital status in Korenman and Neumark's sample divorced and married for a second time, the analysis was problematic[7]. In response Cornwell and Rupert added the 1971 wave of the NLS. In 1971 the cohort was aged 19 to 29, so they picked up more first marriages. In their sample 34 per cent of the men changed marital status and only 52 per cent of the status changes were the result of divorces and second marriages. The inclusion of younger men reduced the size of the estimated marriage premiums only slightly. Their cross section premium (without years of marriage as a regressor) was 8.3 per cent compared with Korenman and Neumark's corresponding premium of 10.6 per cent. The estimated marriage

[7]Identification in fixed-effects analysis is obtained through variation within men over time so the divorces and second marriages would be identifying the model.

premium in their fixed effects analysis fell to 5.8 per cent, which is close to Korenman and Neumark's result of 6.1 per cent. The difference between their fixed-effects and cross-section estimated were statistically significant, rejecting the cross-section estimates.

Cornwell and Rupert (1997) then added tenure in the current job and its square to the list of regressors. Korenman and Neumark (1991) had not included tenure in their published analysis. Tenure proved to be a statistically significant explanator and the size of the marriage premium fell slightly. However, the subsequent inclusion of years married in the analysis revealed that men's wages were unaffected by years married. Cornwell and Rupert claim that this shows that marriage is not productivity enhancing. Despite this claim, they also estimate a hazard rate model explaining tenure. This shows that marriage has the largest statistically significant positive impact on tenure, reminding us of the productivity enhancement effects of marriage.

Modelling the marriage process

Neither study using this approach found strong evidence for the endogeneity of marriage in men's earnings equations.

Nakosteen and Zimmer (1987) firstly estimated, by probit, a reduced form equation for the probability of marriage and constructed a marriage selectivity variable (inverse Mill's ratio) from the coefficient estimates. They assumed that family background variables would affect selection into marriage, but would not affect wages. They included the marriage selectivity variable as an explanatory variable in an equation explaining male earnings. The list of explanatory variables also included a marital status dummy, education and years of work experience. Although the estimated coefficient on the marital status dummy was insignificant the coefficient on the marriage selectivity variable was also insignificant and negative. Although the authors concluded that the marriage premium was a result of endogenous selection others have argued that this conclusion is unjustified (Korenman and Neumark, 1991; Cornwell and Rupert, 1995; and Ginther and Zavodny, 1997). Cornwell and Rupert (1995), using the 1971 wave of the NLSYM, endogenised marital status by the IV technique and

the inverse Mill's ratio approach. In cross-section analysis they found weak supporting evidence for endogeneity using the IV approach. When marital status was assumed to be endogenous it had a negative, but insignificant effect on men's earnings, although the instruments for marital status did not have much explanatory power. Their inverse Mill's ratio was not statistically significant in the men's earnings equation, corroborating Nakosteen and Zimmer's (1987) finding.

2.5 Using Wives' Labour Supply as an Indicator of the Degree of Specialisation

In the analysis undertaken for chapters three and four I consider whether the degree of specialisation could be proxied by the age of the men, reflecting the time spent married, the presence of dependent children, reflecting the need to specialise, and the wives' labour supply, reflecting the result of specialisation. In the more complex empirical analysis undertaken in chapters five and six I use the wife's degree of attachment to the paid labour market as a guide to the degree of specialisation of the couple. I acknowledge that the relationship between wives' labour supply and husband's wages can also be affected by the return to specialisation. Furthermore, in over-time and cross-national analysis one needs to be aware that the mapping between the extent of specialisation and wives' labour supply is not perfect. Attitudes to gender roles continue to evolve and women are increasingly likely to be career focused. While this change has been reflected in women's increased participation in the paid labour market, it could also be reflected in falls in the extent of specialisation in home production for given degrees of labour market participation. Similarly, there may be differences between women, working full-time for example, in the extent of their specialisation in home production.

Empirical evidence suggests that there could be relationships between the amounts of time women spend in the paid labour market and the amount of time they spend in household work. Married women who work full-time spend less

time working at home than other married women do. But the husbands of women who work full-time do not seem to be taking up the slack (Bittman and Pixley, 1997, Baxter, 1989). Instead the dual working couple spend less combined hours working within the home. However, Becker (1985) argued that different activities require different levels of effort. He claimed that many home based activities require less intense effort than the average paid work activity. Child-care is the exception to the rule. Married men may switch the home based activities they undertake to more demanding ones, as their wife increases her level of activity in the paid labour market. For example, Bittman and Pixley (1997) found that amongst couples with children, men with wives who work full-time spend more time caring for children.

The marriage premium literature tends also to describe the couple's degree of specialisation by the wife's degree of attachment to the labour supply (Blackburn and Korenman, 1994; Daniel, 1995; Loh 1996). A growing literature, distinct from the marriage premium literature, has canvassed the possibility that amongst men working in management and/or professional jobs, the labour supply of wives directly impacts on their husband's earnings. Jacobsen and Rayack (1996) summarise the justifications for the observed negative relationship between wives' hours and husbands' earnings, common to this literature. One of those explanations is analogous to specialisation. Henceforth I describe this literature as the management literature.

Proxying the household's degree of traditional gender based specialisation by the number of hours the wife spends in the paid labour market at a point in time is open to criticism on a number of grounds. There may be wives working part-time who earn more and/or are more attached to their careers than full-time workers. Hence their husbands might be more willing to help with household chores. Similarly not all full-time jobs are the same for women. Shift workers have more flexible hours. The husband of a woman who works full-time at night might be more able to invest in his career than one whose wife works full-time in a nine-to-five job. The shift-working wife might be more able to combine unpaid work (like caring for her own children) with her paid work, thus reducing her husband's need to take up the slack.

Both the marriage premium and management literatures identify a number of factors that may make single equation cross-sectional estimation of the effect of wives' labour supply on husbands' earnings problematic. An observed negative relationship between wives' labour supply and husbands' earnings is also consistent with the theory that the wife bases her labour supply decision on her husband's earnings. The more the husband earns the less financial pressure on the wife to earn money in the paid labour market. Another possibility is that marriage occurs as a matching process, in which high labour market-productivity men tend to marry women who are keen not to work in the paid labour market. This scenario reflects a specific sort of selection into marriage. The observed negative relationship between wives' hours and husbands' earnings could reflect matching of husbands and wives on the basis that he desires a career and the wife desires not to have a career.

Furthermore the wives' cross-sectional labour supply may not reflect the couple's long-term specialisation commitment. Using US longitudinal data Loh (1996) accumulated the total number of weeks worked by wives over the duration of marriage (from 1978 to 1989). He created a set of dummy variables from this labour force participation information and regressed the men's wages in 1990 on the dummy variables with the usual controls for observed human capital and the number of years married. Inconsistent with the specialisation hypothesis he found that men whose wives had devoted more time to paid work received a higher marriage premium than those whose wives had not worked. I have concerns with Loh's approach. As far as can be told the labour force participation variable treats a woman who worked part-time for 20 hours per week for five years identically to a woman who worked full-time for 40 hours a week for 2.5 years and either did not work for the other 2.5 years, or was not married for the other 2.5 years. Because there is no interaction with years married this variable is problematic. It confuses times of non-marriage with times when the wife was not working. Furthermore, the difference in intensity of specialisation between a woman working part-time and a woman working full-time, is regarded identical to the difference in intensity of specialisation between a woman not working and one working part-time.

Gray (1997) focused on the relationship between the wives' current continuous hours and men's wages. In the 1970s he found that the marriage wage differential was 1.8 percentage points lower for each extra ten hours per week a wife worked in the labour market. In fixed effects analysis that increased to 1.3 percentage points. In the 1990s those effects were 1.2 percentage points and nil. After correcting for endogeneity he found that the return to specialisation increased over the 1990s in cross-sectional analysis. However endogenised wives' labour supply had no effect on men's wages in fixed-effects analysis.

Jacobsen and Rayack (1996) summarised the management literature findings from cross-sectional regression analysis that did not attempt to control for endogeneity of wives' labour supply. The literature found evidence of a wage premium for husbands whose wives were not working. This wage premium was observed amongst men working as managers and professionals.

Although Jacobsen and Rayack (1996) attempted to disentangle the effect of wives' continuous labour supply on husbands' earnings from the endogeneity and selection effects, I ignore their findings. They did not report on their tests to determine if wives' labour supply was endogenous. Nor did they report on tests to show that the fixed effects analysis was more appropriate than cross-sectional. Cross-section estimation suggested that there was a negative relationship between wives' hours and husbands' earnings if the husbands worked as managers or professionals. This effect persisted for some of the non-management and professional occupations.

Hotchkiss and Moore (1999), using cross-section data from the US March 1993 Current Population Survey, estimated that wives' labour supply was exogenous in the earnings equation of men working as managers, but endogenous in the earnings equation of other men. Men working as managers experienced a working wife penalty, while other men in many cases experienced a working wife bonus. The authors concluded that as the earnings of non-managers increased their wives worked less. Furthermore access to the human capital of wives seems to have been more important to the careers of men working in management. But

men in non-management positions may feel freer to take risky, career advancing decisions when their wives are working.

Blackaby *et al.* (1998) undertook similar analysis using US cross-section data from the 1983 UK General Household Survey. The authors extended Hotchkiss' and Moore's analysis by endogenising the occupation decision. They concluded that wives' hours were exogenous for three of the six occupations. Wives hours were endogenous for managers. In all but two occupations wives' hours had a negative effect on husbands' earnings. However the effect was statistically significant in only three occupations, those in which wives' hours were endogenous. The authors conclude that their findings support the existence of specialisation amongst couples headed by a manager. In couples headed by a less highly skilled worker they argued that these findings supported the effects of discrimination towards traditional marriages.

2.6 Conclusion

This chapter introduced the economics based theoretical justifications for the male marriage premium. It contains a more detailed description and critique of the specialisation within marriage theory, since this is the topic of this thesis. Marriage premium researchers believe that married men earn more than unmarried men because they are more productive. Empirical evidence suggests that the tendency of wives to specialise in work inside the home, thus allowing husbands to focus their attention on paid work, is one of the causes of the earnings differential between married and unmarried men. There is a suggestion that the tendency for couples to specialise has decreased over time in the USA.

In a brief critique of the source of the specialisation hypothesis, Becker's theory of the family, I highlight the value in theorising a link between behaviour inside the family and labour market outcomes. An important criticism of this theory is that, by ignoring the sharing system among family members, it ignores the power relations between the husband and wife, and men and women.

In the empirical analysis I follow the marriage premium literature and tend to use the wives' labour supply as an indicator of the couple's degree of specialisation. As wives increase their labour supply the couple's degree of specialisation falls. Empirical analysts have used this approach with some success, although they stress the importance of correcting for the potential endogeneity of wives' labour supply in husband's earnings equations. Since the degree of specialisation has yet to be measured there are no empirical tests of this assumption. However time-use analysts have shown that married women spend more time in housework than unmarried women and that married women who work full-time spend less time in housework than other married women. There does not seem to be a direct translation between the labour supply of wives and the housework time of their husbands.

CHAPTER THREE

HOW IS SPECIALISATION MANIFESTED IN MALE WAGES?: A PRELIMINARY ANALYSIS.

3.1 Introduction

Amongst other things, Chapter Two outlined the theory that sex based specialisation within marriage was the impetus for the male marriage premium. Results from regression analysis, reported in chapters four, five and six help to determine the usefulness of the specialisation hypothesis as an explanation for the male marriage premium. As an introduction to the data used in those chapters, this chapter details the data sets used and explores how the raw wages of males vary with the degree of specialisation across countries and over time.

According to Becker (1985), specialisation within marriage gives males the incentive to and/or allows males the opportunity to acquire human capital, not measured by standard human capital controls, such as education and years of work experience, more rapidly than if they were unmarried. If specialisation within marriage occurs, and males acquire specialisation related human capital we would expect male wages to rise faster with the degree of specialisation in the marriage. This chapter examines the relationship between specialisation and the rate of increase in male wages over the male working life, using cross-sectional data from Australia, Canada and the USA at different points in time from the late 1970s to the mid 1990s.

Section 3.2 describes the data surveys used in the analysis and illustrates the observed differences between married and unmarried men across countries using the three most comparable data sets, Australia 1989, Canada 1991 and the USA 1991.

Section 3.3 describes the methodology used to compare specialisation with men's wages. Briefly, for each data set I graphed the hourly wage of men over their working lives, their age-wage profiles. Men were grouped by their supposed

degree of specialisation; unmarried, married with a working wife and married with a wife who was not working. Comparison of these age-wage profiles provides some guide as to the veracity of the prediction that hourly wages increase with the degree of specialisation within marriage. The specialisation theory suggests that the net increase in a male's wage over his working life should be greatest for men whose wives do not work. Next in size should be the wage increase of married males whose wives work, with the wage increase of never married males being the smallest.

I hypothesised three reasons why there might be cross-country and over-time differences in the extent of specialisation and hence the sizes of the gaps between the age-wage profiles. Firstly, there might be differences in the length of time the average male spends married. The length of time in marriage has implications for the opportunity and motivation to specialise. Secondly, there could be differences in the continuity of the labour supply of wives. So the wife's attachment to the paid labour market at a point in time might be differentially representative of the longer-term specialisation commitment of her marriage. Thirdly, the extent of sex discrimination in the paid labour market might differ between countries and over time, providing different impetus for couples to specialise.

Section 3.4.1 illustrates how the progression of male wages over the male's working life varies with the male's supposed degree of specialisation in Australia 1989, Canada 1991 and USA 1991. Section 3.4.2 considers how changes over time in specialisation might affect the course of the male wage by comparing data from Australia 1981 and 1994, Canada 1981 and 1994 and USA 1979 and 1994.

Conclusions are offered in section 3.5. The preliminary analysis reported in this chapter proved to be a reasonably powerful test of the relevance of specialisation. It also illustrated the importance of the further analysis undertaken for this thesis, for example the need to consider the effects of the return to specialisation, as well as the degree of that specialisation.

3.2 The Data

3.2.1 The data sets

This thesis draws on the international data sets developed by the Luxembourg Income Study (LIS) (de Tombeur, 1998); that is Australia 1981, 1989, 1994; Canada 1981, 1991, 1994; and the USA 1974, 1991, 1994. For over a decade LIS has been involved in harmonising national survey data on household incomes, income components (for example, earnings) and demographics with a common conceptual framework so as to facilitate cross-country comparisons. LIS has established a framework of data consistency that permits ready comparability of results from analyses that employ the LIS data. *Table 3.1* is a summary of the main facets of the source surveys used by LIS to construct the data sets analysed for this thesis.

Australia

The Australian surveys were conducted throughout Australia as a multi-stage area sample of private dwellings (houses, flats, etc.) and a listed sample of non-private dwellings (hotels, motels, etc.). Military establishments were not surveyed. Sampling probabilities were based on population estimates from the census and other data sources.

In the first two surveys, approximately 15,000 households were interviewed between mid-September and mid-December in 1982 and 1990 respectively. Annual income related to the financial years, that was the year commencing June 1981 and June 1989 respectively. Current income related to income in the reference week, that was the week preceding the interview. The interviewing period, mid-September to mid-December, was chosen as a period that was not particularly associated with seasonal bias. In the 1994 survey 7 500 households were interviewed at a uniform rate over the year commencing June 1994. The annual data refers to the 1993-94 financial year. The current income relates to the reference week.

Table 3.1: The source surveys for the LIS data sets

	Australia (1981, 1989, 1994)	**Canada** (1981, 1991, 1994)	**USA** (1979, 1991, 1994)
Name of Survey	1981 - Income and Housing Survey 1989 – Survey of Income and Housing Costs and Amenities 1994 – Survey of Income and Housing Costs (SIHC)	Survey of Consumer Finances	March Current Population Survey
Surveying Body	Australian Bureau of Statistics	Statistics Canada	Bureau of the Census – Central Statistical Office
Survey Status	1981, 1989 Stand alone survey 1994 Monthly Population Survey Supplement	Labour Force Survey Supplement	Stand alone survey
Sample	Sample of private dwellings and non-private dwellings – one-third of 1% of population in 1981 Selection probabilities based on population estimated from the census and other data sources	Sample of private dwellings, with the exception of households on Native American reserves and households in the Yukon and Northwest Territories	Sample of all housing units
Demographic statistics	At survey date: September to November of 1982 for 1981 survey, for example	At survey data: February through May 1982 for 1981 survey, for example	At survey date: March 1980 for 1979 survey, for example.
Wage and salary income	The financial year (June to June) preceding the survey The 1981 and 1994 LIS data sets also include income from reference week	The financial year preceding the survey The 1981 LIS data set also includes income from reference week	The financial year preceding the survey The 1979 LIS data set also includes income from reference week

When the SIHC was introduced in 1994-95 to replace the previous surveys, there were some alterations to the methodology. The change from the interview period of three months to twelve months could have worsened the reliability of the income data. For some respondents, a longer time period had elapsed between the completion of tax returns and the survey date. Others would not have completed their tax returns. This could have implications for the respondents' ability to

recall correctly their income data for the previous year. Furthermore the change from stand-alone survey to one attached to another survey may have made the income measures less reliable. Because of this there was less reference to records, such as income tax forms, in the 1994 survey.

In each survey, effort was made to identify income units that had undergone major demographic and labour force changes between the previous financial year and the time of interview. These income units were flagged and it was suggested that analysts exclude them from analysis of income data on the basis that the annual data did not refer to the full year. For example, for the 1989 survey, the ABS flagged persons who changed marital status in the year commencing June 1989. However, LIS chose to include these income units in their data sets.

Canada

The Canadian data was generated from the relevant Canadian Surveys of Consumer Finances. A stratified cluster probability sample design is employed in the Survey of Consumer Finances. The final stage sampling-frame comprises a list of all private dwellings in the ten Canadian provinces. This sampling frame includes the total population of private household heads, with the exception of households on Native American reserves, and households in the Yukon and Northwest Territories.

The Canadian surveys are conducted following the end of the tax year (February through May), thereby minimising errors in reporting annual income.

USA

The Current Population Survey is conducted throughout the USA. The sampling frame for the survey consists of a list of all housing units compiled from the most recent decennial census of population and housing, supplemented by lists of newly constructed dwellings. The sample design is a multistage stratified probability sample of the population from the entire geographic area of the US, including Hawaii and Alaska. Puerto Rico and other territories are not included. For the 1979 survey approximately 62 000 households were interviewed.

3.2.2 Important variables and the samples

The three most important variables in an analysis of the relationship between marital status and hourly wage and salary income are marital status and the income and hours of work variables used to construct the hourly wage. *Table 3.2* summarises information on the three variables for the three countries, facilitating a discussion of the cross-country and over-time comparability.

Table 3.2: Important variables for an analysis of the male marriage premium

	Australia	Canada	USA
Wage and salary Income	1981 and 1994 – hourly wage from reference week 1989 annual earnings, not top-coded	1981 – hourly wage from reference week 1991 and 1994 – annual earnings, not top-coded	1979 – hourly wage from reference week 1991 and 1994 – annual earnings top-coded at US$100,000
Hours worked in reference week	1981 N/A 1989 – categorical and top-coded at 50 1994 – continuous and top-coded at 50	1981 N/A 1991 and 1994 - continuous and top-coded at 65	1979 N/A 1991 and 1994 continuous and top-coded at 99
Married	Heterosexual couples in de-facto relationships are coded identically to legally married couples	Heterosexual couples in de-facto relationships are coded identically to legally married couples	1979 – legally married couples only 1991 and 1994 – de-facto couples also identified.
Never married	Never married are identified in 1989 and 1994	Never married are identified in 1991 and 1994	Never married are identified in 1991 and 1994

I concluded that cross-country comparison was best undertaken with the Australia 1989, Canada 1991 and US 1991 data sets. I was able to construct the most similar samples, hourly wage and marital status variables with these data sets. Over-time comparisons were made with the oldest and most recent data set for each country. The samples and variables used were consistent within each country, but not over countries. *Table 3.3* summarises the samples used for cross-country comparison and over-time comparison.

In terms of marital status, each of the Australian and Canadian surveys treated legally married men and men in de-facto couples as married. In the 1979 US survey de-facto couples were not identified. Hence married men only included legally married men. In the two most recent US surveys de-facto couples were

identified, so I was able to code men in de-facto couples as married. In the two most recent surveys for each country never married men were differentiated from divorced, widowed and separated men. In the oldest surveys they were included with divorced, widowed and separated men.

The cross-country comparisons included currently married men and never married men. Divorced, widowed and separated men were excluded from the analysis. Currently married men included men in heterosexual de-facto couples. In over-time analysis I compared currently married men with unmarried men (never married, divorced, widowed and separated men). In the Canadian and Australian data sets men in heterosexual de-facto couples were recorded as married. In the US data sets men in heterosexual de-facto couples were recorded as unmarried.

To focus on employees, where possible I excluded self-employed men and men married to self-employed women from the analysis. Men were excluded if they worked in the agriculture industry or were married to women employed in the agriculture industry. Finally, because in the majority of data sets hourly income was calculated from annual income, I focussed on men working full-time full-year.

In all the data sets used for cross-country comparisons, Canada 1994 and USA 1994, wages were calculated from the annual income data and the hours worked in the reference week. Analysing wage information calculated like this can be problematic since the wage information does not necessarily match the personal characteristics. Individuals who have changed jobs during the previous financial year or in the months preceding their interview will have inconsistent job characteristics such as industry, occupation and hours of work per week. Furthermore ,hours of work per week is collected for the reference week only.

LIS provided the hourly wage for wage and salary earners for the Australia 1981 and 1994, and Canada 1981 and USA 1979 data sets, using information from the reference week.

Table 3.3: Members of the samples by country and year

Australia 1989 Canada 1991 USA 1991		Australia		Canada		USA	
		1981	1994	1981	1994	1979	1994
✓	Men aged 20-65	✓	✓	✓	✓	✓	✓
✓	Currently married includes men in defacto relationships	✓	✓	✓	✓		
	Unmarried includes divorced, widowed and separated	✓	✓	✓	✓	✓	✓
	Unmarried includes men in defacto relationships					✓	✓
✓	Unmarried is never married. Divorced, widowed and separated excluded from analysis						
✓	Men working in agriculture excluded	✓	✓			✓	✓
✓	Husbands of women working in agriculture excluded	✓	✓			✓	✓
✓	Self-employed men excluded			✓	✓	✓	✓
✓	Husbands of self-employed women excluded			✓	✓	✓	✓
✓	Working full-time	✓	✓	✓	✓	✓	✓
✓	Working full-time full-year			✓	✓	✓	✓
	Hourly wage based on weekly earnings* and hours worked in that week	✓	✓	✓		✓	
✓	Hourly wage based on annual earnings* and annual hours worked				✓		✓

* Earnings from wages and salaries

3.2.3 Who are never married men?

A not uncommon reaction to hearing that married men earn more than never married men is to think that indeed they should. Some would think that never married men are men who are yet to marry or men so "different" that they will never marry. Of course men who are yet to marry are generally younger than married men, and hence should earn less on those grounds. Furthermore, what

makes the remaining never married men "different" could mean that they are less productive in the paid labour market.

Table 3.4 illustrates that, on average, amongst men working full-time full-year - currently married men were older than never married men in the three countries. However, never married men were significantly more likely to be tertiary educated and less likely not to have graduated from secondary school. It is possible that more educated men tended to delay marriage until they finished studying or established their careers.

Table 3.4: Age and education of men working full-time full-year by marital status and country

	Australia 1989		Canada 1991		USA 1991	
	Married	Never married	Married	Never married	Married	Never married
Age (in years)	40.0	31.3	41.0	33.0	40.7	33.0
Tertiary educated (%)	15.4	22.1	16.1	25.7	27.4	36.9
Less than secondary education (%)	28.9	21.4	18.0	9.9	11.5	7.7

Figures 3.1 to *3.3* illustrate the evolution of men's marital status over the working life for each of the countries. In each age group currently married men comprised at least 60 per cent of the men. At least 80 per cent of men, aged over 40 were currently married. Indeed, never married men were proportionately more important in the younger age groups. However, there was a small, but significant, number of never married men in all age groups. *Appendix 3.A* details how many never married men there were in the older age groups to assure the reader that empirical analysis comparing married men with never married men can be undertaken.

Figure 3.1: Marital status of men working full-time full-year over the working life: Australia 1989

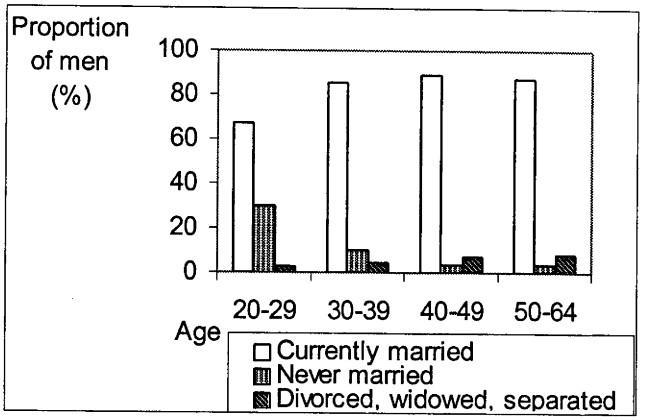


Figure 3.2: Marital status of men working full-time full-year over the working life: Canada 1991

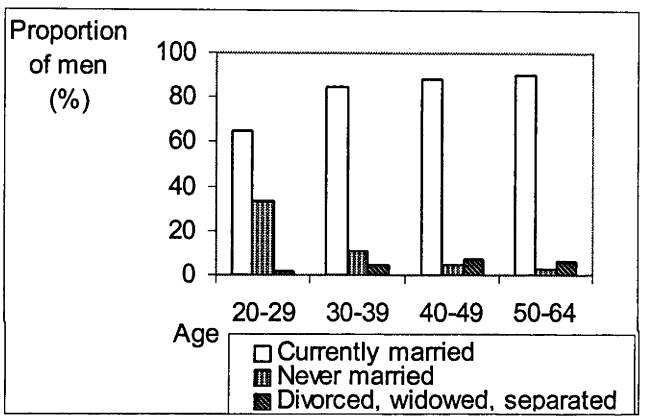
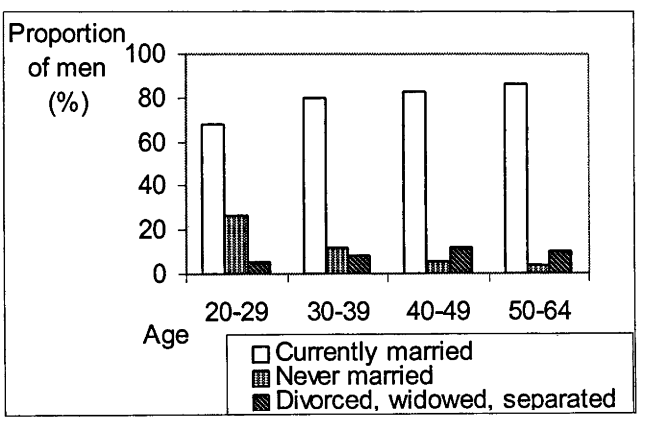


Figure 3.3: Marital status of men working full-time full-year over the working life: USA 1991



But is it true that the more educated never married men tend to be in the younger age groups and that older never married men less educated and potentially less productive in the paid labour market? For each country *Table 3.5* shows how the marital status and education of men evolves over the working life. Canadian and the US never married men were more likely to be tertiary educated at any age, and more likely to have graduated from secondary school. This was only the case for Australian men younger than 40. Amongst Australian men aged 50 or more, never married men were less likely to be tertiary educated. Amongst Australian men older than 40 never married men were less likely to have graduated from secondary school. These observations imply that Canadian and US never married men were potentially more productive, in terms of education, in all age groups. Amongst Australian men however, it is possible to argue that there were two groups of never married men; the group of relatively young, more educated men delaying marriage to establish a career and the group with relatively little education spread across all age groups.

Table 3.5: How does education vary with marital status over the working life?

Age and marital status	Australia 1989		Canada 1991		USA 1991	
	Tertiary education (%)	Less than secondary education (%)	Tertiary education (%)	Less than secondary education (%)	Tertiary education (%)	Less than secondary education (%)
20-29						
Currently married	9.9	27.5	11.0	13.0	16.6	13.8
Never married	17.2	17.8	18.9	7.6	35.1	6.5
30-39						
Currently married	18.8	23.7	15.2	12.3	28.1	8.8
Never married	32.2	19.9	22.9	10.6	36.5	6.6
40-49						
Currently married	17.5	28.7	17.9	18.7	32.6	9.0
Never married	28.3	32.6	38.1	14.3	41.9	10.8
50 +						
Currently married	10.6	39.5	13.7	36.1	26.8	17.4
Never married	8.1	43.2	22.9	22.9	41.0	15.4

However, married men earned more than unmarried men, after education and age had been controlled for. Labour market earnings are not only affected by age (experience in the labour market) and education. There may be unobserved characteristics that leave unmarried men less productive in the paid labour market. This thesis focuses on the earnings outcomes of a select group of men, those who

worked full-time for the entire surveyed year. Earnings are but one labour market outcome. Another key one is employment. *Figures 3.4* to *3.6* detail the marital status breakdowns of unemployed men over the working life in each of the countries. Comparison of the proportions of never married unemployed men in these figures with the proportions of never married employed men working full-time full-year tells us the propensity for never married men to be unemployed. It appears that never married men aged in their 20s were significantly more likely to be unemployed than currently married men in all countries. While this tendency continues over the working lives of men in all countries it was significantly more marked in the USA.

Figure 3.4: Marital status of unemployed men over the working life: Australia 1989

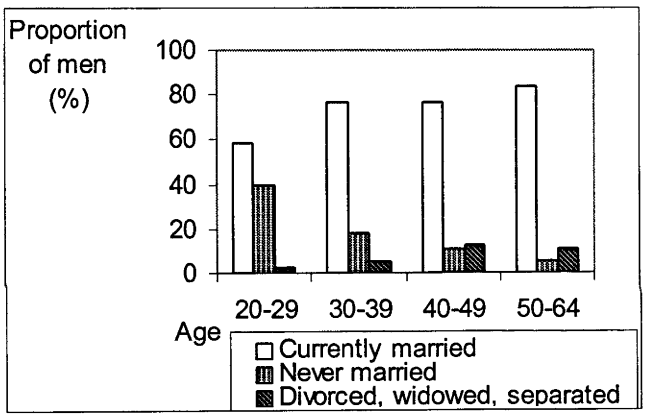


Figure 3.5: Marital status of unemployed men over the working life: Canada 1991

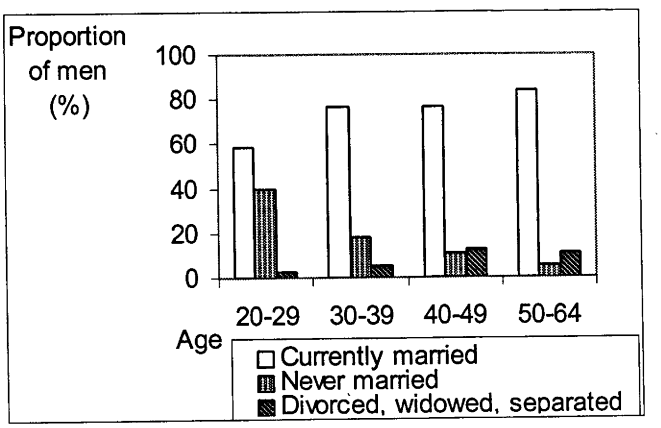
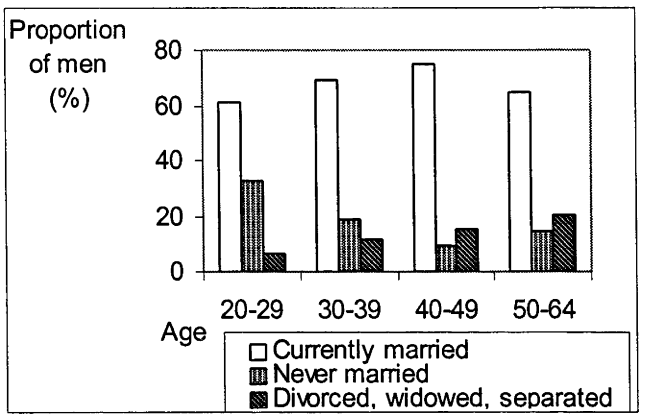


Figure 3.6: Marital status of unemployed men over the working life: USA 1991



3.3 Methodology: How was the Degree of Specialisation Reflected in the Progression of Male Wages over the Working Life?

In this section I describe the methodology upon which this chapter is based. I constructed age-wage profiles for men grouped by their degree of supposed specialisation; unmarried, married with a working wife and married with a wife who was not working. The age-wage profiles were graphed as the raw hourly wage by age brackets, over the working life. The hourly wage was indexed at one for unmarried men aged 20 to 24. I did not control for other measures of observed human capital like education, ethnicity or location.

Labour economists use cross-sectional age-earnings profiles to describe the course of earnings/wages over the working life of the average worker. Although, as Thornton *et al.* (1997) explained, a cross-sectional earnings profile fails to accurately portray a longitudinal earnings profile, it is the best tool available to uncover differences in the progression of wages between males with varying degrees of specialisation.

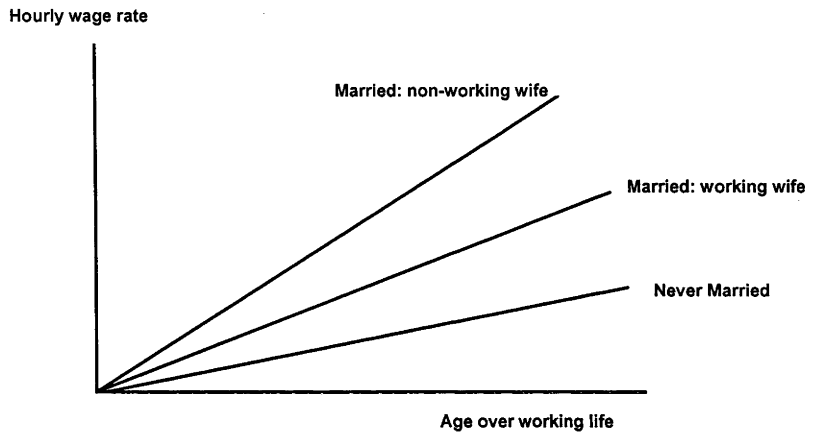
As previously noted, the more specialised a male, the more rapidly his wages are expected to increase over his working life[1]. Never married males are less specialised than all married males. Following the reasoning outlined in Chapter Two it is assumed that a married couple in which the wife works in the paid labour market (henceforth a "working wife") will be less specialised than a couple in which the wife devotes her time to household responsibilities (henceforth a "non-working wife")[2]. In this chapter the presence of a non-working wife indicates a male with the highest degree of specialisation. *Figure 3.7* illustrates the expected relationship between the degree of specialisation and the course of wages over a man's working life[3]. Because the data sets do not contain information on the number of years married I substitute age for years married. This is an approximation because married men will not have been married for the same number of years at any given age. The gap between the lines widens as the men age. This is consistent with the specialisation hypothesis, as long as the length of marriage increases proportionally with age.

[1] In theory the hourly wage rate of a male might fall over the latter part of his working life, so working life-wage increase is a net wage increase.

[2] A conventional wisdom in female labour supply literature is that the labour force attachment of a married woman varies markedly over her life with changing family, particularly child-care, responsibilities. However Nakamura and Nakamura's (1994) analysis of Canadian data suggests that a married woman's work history (for example, whether or not she was working last year) may be just as important a predictor of whether or not she is currently working as is the age and number of her children. This finding provides some confidence that the wife's current employment status can act as a meaningful proxy for the long-term specialisation arrangement that she has with her husband.

[3] The rate of increase in the wage rate tends to be largest in the early stages of the male's working life, tapering off as he nears retirement. Hence the depiction of the wage age profile as a straight line is technically inaccurate, although easier to draw.

Figure 3.7: Age earnings profiles for males working full-time by degree of specialisation in marriage



In this section I identify three factors that may cause differences, across countries and over-time within a country, in:

- the amount of specialisation undertaken; and/or
- the relationship between men's age and the amount of specialisation undertaken; and/or
- the closeness of the mapping between the wives' labour supply at a point in time and the longer-term specialisation commitment of the couples.

i) Number of years spent married: opportunity and motivation to specialise

As explained in Chapter Two, according to the specialisation hypothesis the increment in unobserved human capital resultant on specialisation increases with each year of marriage. Schoeni (1990), Korenman and Neumark (1991) and Gray (1997) found that the number of years that a man has been married, and its square, were more effective controls for marital status effects on wages than were marital status dummies. Unfortunately, the length of marriage is not recorded in the LIS data sets.

The number of years spent married by a representative married male, at a given age, could vary between countries and over time. The longer the representative male was married at a given age the more intense will be the effect of

specialisation on age-wage profiles. Furthermore, the shorter is the time spent married the less time men have to accrue specialisation related human capital. This also means there will be less impetus to invest in unobserved human capital. Blinder and Weiss (1976) showed that investment is undertaken to the extent that investment costs can be recouped.

Chandler *et al.* (1994) undertook an analysis of the effect of delaying (de-jure) marriage on earnings using US data from the late 1980s. Contrary to the prediction outlined in the previous paragraph, they concluded that delaying marriage did not negatively affect the wages of married men. However they did not control for the possibility that the men who were prone to delay marriage may have been more career-oriented. Nor did they account for de-facto relationships.

I used the proportions of men currently married and never married (where available) as guides for the potential length of time spent married. As indicators of cross-country and over-time differences in the 'time spent married' these proportions will be less accurate if there are cross-country and over-time differences in the proclivity to divorce and re-marry.

Appendix 3.B lists these proportions by age group, for men in Australia 1989, Canada 1991 and the USA 1991. The samples of men used in the analysis were described in section 3.2. They only included men who had worked full-time for the entire surveyed year. I have also included divorced, widowed and separated men. By the age of 24 over half of the sampled men were currently married or in de-facto relationships in each of the countries. The proportions of currently married and never married Australian and Canadian men were fairly similar in each age bracket. The proportion of US currently married men aged 20-24 was much larger than the corresponding Australian and Canadian proportions; 67 per cent versus 56 percent and 52 per cent respectively. However amongst men aged 30 or more there were relatively more US never married men than Australian and Canadian never married men.

From this information it appears that Australian and Canadian men would have spent, on average, a similar number of years married in each age group. However, it is difficult to hypothesise how US men would compare on these grounds.

Appendix 3.C contains the proportions of currently married and unmarried men for Australia 1981 and 1994, Canada 1981 and 1994 and the USA 1979 and 1994. As explained in section 3.2 the samples of men used are consistent within each country but not between countries. It is clear from these proportions that the over-time trend for Australia and the USA, was for currently married men to have spent less time married for any given age. This conclusion is consistent with Blackburn and Korenman's (1994) observations on US men. They had data on the length of marriage. There was little change in the Canadian proportions between 1981 and 1994.

ii) Wives' attachment to the paid labour market: mapping specialisation

The second factor refers to the tendency of married women's attachment to the paid labour market to follow a pattern related to their stage in the life-course. That pattern can be described thus. In the early years of marriage the wife works full-time. When she has children she decreases the hours she works in the labour market, sometimes to the extent of exiting the labour market. This reduction in the hours worked by the wife generally coincides with the time in her husband's career when he experiences the greatest wage increase. Often the wife returns to the labour market or increases the hours she works in the labour market when her children are old enough to be put in care. This return to the labour force depends on the cost and availability of child-care, factors that vary considerably across the countries and time.

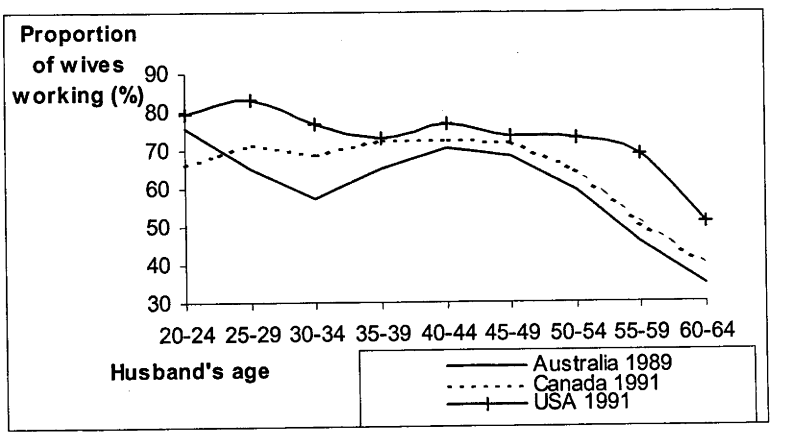
Over-time and cross-country differences in the prevalence of this pattern have implications for observations on the specialisation hypothesis based on analysis of cross-sectional data. The couple's degree of specialisation is approximated by the wife's attachment to the paid labour market. The degree of specialisation is presumed to be a 'long-term' commitment. However, in cross-sectional analysis, this commitment is measured by the wife's employment status at a point in time. The less pronounced is the wife's life-course pattern of labour force attachment the more likely her labour supply at any point in time reflects her longer-term

attachment and the degree of specialisation in the couple. Hence the gap between the age-wage profiles of married men should be more pronounced.

Figure 3.8 illustrates how the wives' labour supply varies over the husbands' working life for Australia 1989, Canada 1991 and the USA 1991. I have used cross-sectional data to approximate a longitudinal phenomenon. The figure illustrates that the wives of the oldest men were least likely to work and/or the wives of men in the oldest cohort were least likely to work. In Australia and the USA the wives most likely to exit the labour market were married to the men in the younger cohorts. The proclivity to work of Canadian wives was relatively constant until the husband turned 50. This is consistent with the findings of Nakamura and Nakamura (1994), that for a Canadian woman, her most recent year's labour supply may be just as important a predictor of whether or not she is currently working as is the age and number of her children. It seems that Australian women were the most likely to exit the labour market around the birth of their children, and Canadian women the least likely.

I conclude that the labour supply of an Australian wife at any point in time would be the least accurate predictor of her long-term labour supply. However, it is difficult to distinguish between Canadian and US wives on this basis.

Figure 3.8: Wives' labour supply over their husbands' working lives



Over time the tendency of wives to follow this pattern of attachment to the labour force decreased in Canada and the USA, but remained relatively constant in

Figure 3.9: Wives' labour supply over their husbands' working lives: Australia

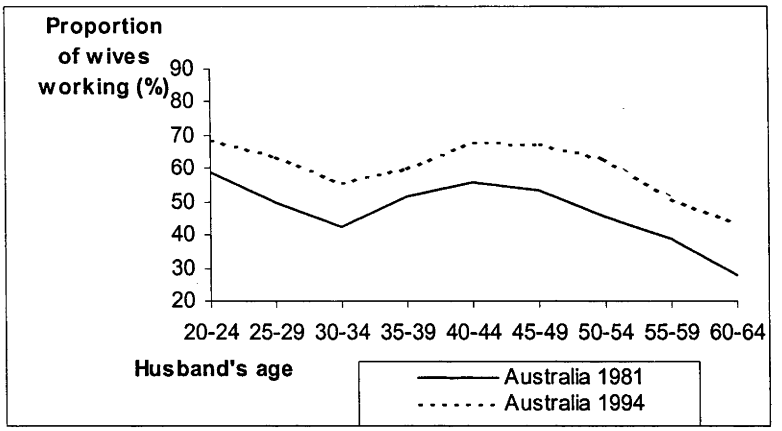


Figure 3.10: Wives' labour supply over their husbands' working lives: Canada

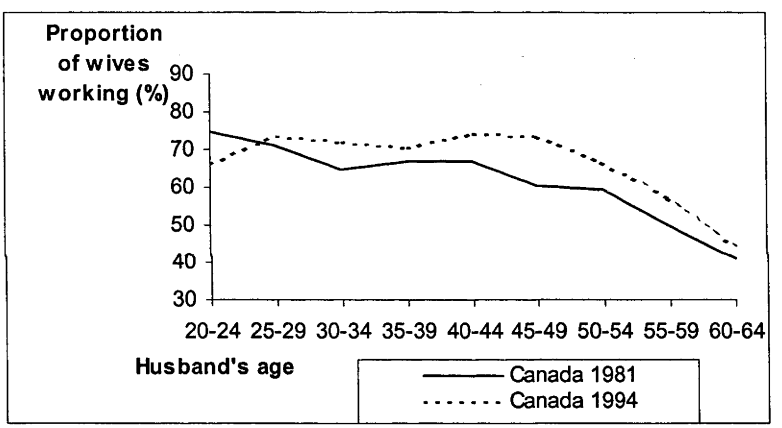
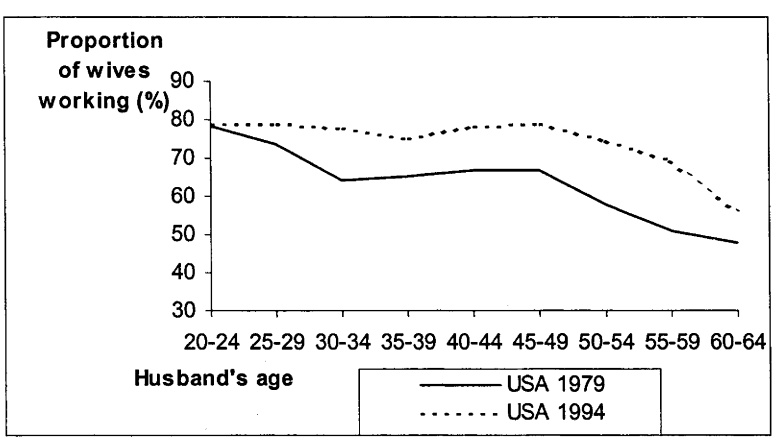


Figure 3.11: Wives' labour supply over their husbands' working lives: USA



Australia[4]. *Figures 3.9, 3.10* and *3.11* illustrate the over-time comparisons for Australia, Canada and the USA respectively. Although Australian women were more likely to be working in 1994, the figure suggests that there was little change in the tendency for women to exit the paid labour market around the birth of a child.

This implies that a wife's attachment to the labour force will be more constant over her working life in the more recent Canadian and US surveys[5]. Hence, we can assume that a wife who is working full-time at age 40 will have spent more years in full-time employment in the more recent surveys. Similarly, a wife who is not working will have spent more years not working in the more recent surveys. So, in the more recent surveys, the wage-age profiles of married males with non-working wives in the USA and Canada will be steeper and the similar profile for married males with working wives will be less steep in both countries. The difference between the two profiles should be more pronounced. It is also possible that the difference in the profiles of unmarried and married men with working wives will be less pronounced.

The sex wage gap: motivation to specialise

According to Becker (1985) one motivation to specialise is discrimination against women in the paid labour market, evidenced in the wage gap between the husband and wife. Even if a husband and wife had the same basic productivity, Becker claims that there would be motivation to specialise if the wife was discriminated against in the paid labour market in terms of her earnings. As Becker (1985) argues, if women's earnings were ten per cent less than men's due to discrimination, women would tend to specialise in the household and men in the labour market. As a result, earnings of the average woman would be considerably less than those of the average man. Let us hypothesise, for example, that the average woman earned 60 per cent of what the average man earned. Ten

[4] See, for example, Mitchell (1998).

[5] This conclusion is consistent with Lombard's (1999) findings that the fraction of US women who worked a full year had increased from 1977-1981 to 1987-1991. She also found that there had been a decrease in the fraction of women who did not work at all over the same period. Between 1975 and 1991 she observed a substantial decrease in the exit rate from employment; a finding which also held for women with young children.

percentage points of the 40 per cent gap could be due to discrimination and 30 percentage points due to differential investment in human capital, as women respond to discrimination by investing less in the paid labour market.

Hence, the component of the sex wage gap related to gender based discrimination has implications for the motivation to specialise. I assumed that the greater is the extent of sex discrimination in pay the more pronounced is specialisation. To be fully specialised in the paid labour market one needs to work full-time. Hence I compared the full-time wages of men and women as a guide to the relative wage earning ability of husbands and wives.

The traditional tool for decomposing sex wage gaps is the technique developed by Blinder (1973) and Oaxaca (1973). This decomposition technique splits the sex wage gap into that part resultant on differential holdings of observed human capital and that part resultant on the differential returns to observed human capital. Sex based discrimination has been interpreted as the second part. This tool has been used for making comparisons over time and between countries.

More recently, Juhn *et al.* (1991) developed a technique to decompose over-time changes in the wage gap between white and black Americans. They related a portion of the Blinder-Oaxaca "discrimination" part to the general trend of growing wage inequality. This, they argued, should not necessarily be seen as discrimination against blacks, since growing wage inequality affected all workers with relatively low levels of human capital. However, Juhn *et al.* (1991) do explain that when discrimination is present it is difficult to isolate the pure effect of wage inequality.

The Juhn *et al.* technique has been adopted by Blau and Kahn (1992, 1994, 1996a, 1996b, 1997, 1999) to decompose the changes in the US gender wage gap over time and cross-national differences in the sex wage gap. Chapter Five contains a more detailed explanation of this decomposition technique in equation form. The first term of a standard Juhn *et al.* decomposition of a cross-country wage gap reflects cross-country differences in the gap in the amount of observed human capital held by men and women. The second term reflects the cross-country difference in the return to observed human capital received by men. The third

term may reflect cross-country differences in the gap in unmeasured human capital held by men and women and/or cross-country differences in the extent of labour market discrimination against women. I assumed that this term describes discrimination. The fourth term implicitly reflects cross-country differences in the effect of discrimination. The conceptual basis of this term is that, if a group is discriminated against, members of the group are paid as if they have a skill level below their true level. So if the return to skill levels differs between countries, so too will the effect of discrimination. I also regarded this term as discrimination relevant to the specialisation decision. Blau and Kahn, on the other hand, would sum the second and fourth terms and consider the sum a reflection of cross-country differences in the overall wage structure. They would argue that, since all those discriminated against suffer from the effects of a diverse wage structure, the fourth term is not specific to women.

Below I summarise the findings of studies that have decomposed the relevant cross-national gender wage gaps and over-time wage gaps.

Australia and Canada

Kidd and Shannon (1996) decomposed the sex wage gap between Australia and Canada using data from the 1989 Canadian Labour Market Activity Survey and the 1989-90 Australian Income Distribution Survey, the survey that the LIS 1989 data set is derived from. On average women earned 33 per cent less than men in Canada and only 15 per cent less in Australia.

I considered the specification excluding occupation and industry. Using the Juhn *et al.* decomposition technique the authors found that much of the mean log wage difference in the gender wage gaps (0.1435) was explained by the third term. The sum of the third and fourth terms explained 86–123 per cent of the cross-country difference, depending on the specification of work experience. Hence discrimination explained almost all the sex wage gap difference. There was more sex-based pay discrimination in Canada than in Australia.

Australia and USA

Blau and Kahn (1992) decomposed the pair-wise comparisons of the sex wage gaps of the United States and nine other advanced countries, including Australia. They used data from the 1986 Income Distribution Survey for Australia and the 1985-1988 International Social Survey Programme for the USA.

The cross-country difference in the log wage gap (between men and women) was 0.0916 log points. The sex wage gap was larger in the US. The sum of the third and fourth terms of the Juhn *et al.* decomposition was 0.0814. The third term explained 0.0410. Hence the cross-country difference in the sex wage gap was explained primarily by the fact that there was more discrimination in terms of pay in the USA.

I found no recent published studies comparing the sex wage gaps of Canada and the USA. Hence I concluded that Australia exhibits the least amount of sex-based pay discrimination, suggesting that Australian couples would be least motivated to specialise.

Over time

Australia

The most recent decompositions of over-time changes in the Australian sex wage gaps focussed on changes over the 1980s (Preston, 1997; Kidd and Meng, 1995) and over the 1970s and 1980s (Spilsbury and Kidd, 1997). All used versions of the Blinder-Oaxaca decomposition technique. Spilsbury and Kidd also used the Juhn-Murphy technique. Preston compared log weekly wages of full-time workers from the 1981 and 1991 censuses. Kidd and Meng compared the log of weekly earnings of full-time workers from the 1981 and 1989 Income Distribution Surveys. Spilsbury and Kidd compared log hourly wages of full-time workers in the 1973 Social mobility Survey and the 1989 Income Distribution Survey.

Preston[6] concluded that the sex wage gap of full-time workers fell by 9.2 percentage points and 60 per cent of this reduction (5.5 percentage points) was caused by decreased discrimination. Kidd and Meng concluded that the sex wage gap fell by 6.6 percentage points and 55 per cent of this reduction (3.6 percentage points) was due to decreased discrimination.

Using the Juhn *et al.* decomposition technique Spilsbury and Kidd concluded that labour market structure only made a small contribution to the convergence in wages over the 1970s and 1980s. Their finding was consistent with Borland and Wilkins (1994), who concluded that there had been little change in overall wage inequality over the 1980s.

Canada

Doiron and Riddell (1994) was the only Canadian published study to have considered changes in the sex wage gap since the early 1980s. The purpose of their analysis was to examine the impact of unionisation on the sex wage gap. They decomposed the sex gap in hourly earnings using data sets from 1981, 1984 and 1988. The data sets were derived from different surveys, although each of the surveys was attached to the Labour Force Survey. While comparable data showed that the ratio of women's average hourly earnings to men's increased slightly from 54 per cent to 57 per cent over the period, the gap between the average log wages of men and women increased from 0.259 to 0.263 between the 1981 and 1988 surveys. Their standard Blinder-Oaxaca decomposition suggested that the 'discrimination' component of the wage gap increased from 0.180 log points to 0.188 log points. The authors included occupation and industry as explanatory variables in the earnings equations.

USA

Blau and Kahn (1997) decomposed changes in the sex wage-gap for full-time workers using the 1980 and 1989 surveys from the PSID. Between these years the male-female pay gap narrowed by 0.1522 log points. In the specification excluding occupation and industry controls the component, the sum of the third

[6] The list of regressors included industry and occupation.

and fourth terms of the Juhn *et al.* decomposition contributed 0.1187 log points (nearly 80 per cent) to the narrowing sex wage gap.

Ahraf (1996) used the Blinder-Oaxaca decomposition technique to decompose changes in the sex wage gap (for full-time workers) over the 1980s using the PSID. Ahraf provided two sets of earnings ratios, based on the predicted values from regressions. One was unadjusted, and the other included a Heckman correction. The unadjused ratio of women's wages to men's fell from 68.2 per cent to 63.1 percent while the adjusted rate increased from 60.2 per cent to 68.0 percent. The results of his standard Blinder-Oaxaca decomposition suggest that the discrimination component of the sex wage gap fell from 32 to 37 per cent in 1981 to 21 to 24 per cent in 1989.

So, it appears that the size of the discrimination component of the sex-wage gap fell over the 1980s in Australia and the USA. In Canada it did not fall. In fact it may have risen. I presumed that these trends were not reversed in the first half of the 1990s, although there were no studies to justify this view.

3.4 Empirical Observations

In this section I compare the predictions from section 3.3 with the age-wage profiles.

3.4.1 Australia 1989, Canada 1991 and USA 1991

Appendix 3.D reports the hourly wage rates, in index form, of married and never married men over their working life. The indexes were constructed by setting the average wage of unmarried men, aged 20 to 24, to unity in each data set. To monitor the effects of specialisation the married men were separated into two sub groups - married men with working wives and married men with non-working wives. Comparison of the progression of wages over the working years of males

differentiated by their degree of specialisation is illustrated by graphing the wage indexes. These graphs appear in *Figures 3.12* to *3.14*.

In section 3.3 I made three sets of predictions of how the age wage profiles would compare across these countries.

i) In terms of the number of years that the average man would have been married I argued that Australian and Canadian men would have been much the same. As I was unsure how US men would compare, I did not predict differences in the relationship between the predicted degree of specialisation and the wage-age profiles on this basis.

ii) In terms of the wife's attachment to the paid labour market I would expect that the cross-section labour supply of Australian wives would be least reflective of the couples' long-term specialisation commitment. Hence we should observe that the gap between the age-wage profiles of Canadian men and US men should be wider than the corresponding Australian gap.

iii) In terms of sex based pay discrimination I argued that Australian wives would have suffered the least amount of pay discrimination. Hence, the Australian gap between the wage-age profiles of never married men and currently married men should be the smallest.

Figure 3.12: Wage-age profiles for men by degree of specialisation in marriage: Australia 1989

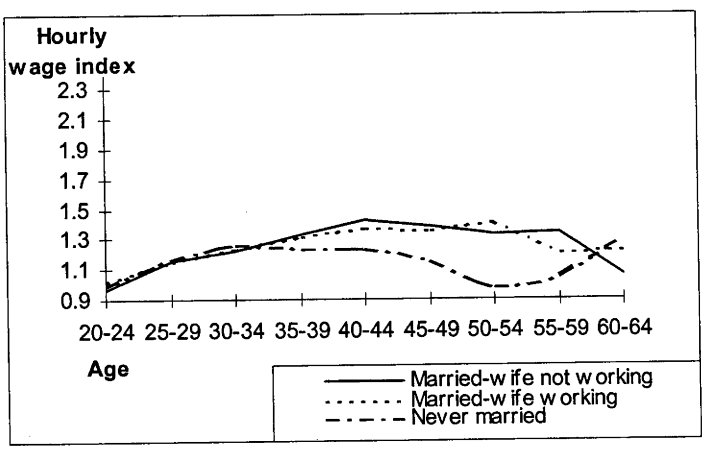


Figure 3.13: Wage-age profiles for men by degree of specialisation in marriage: Canada 1991

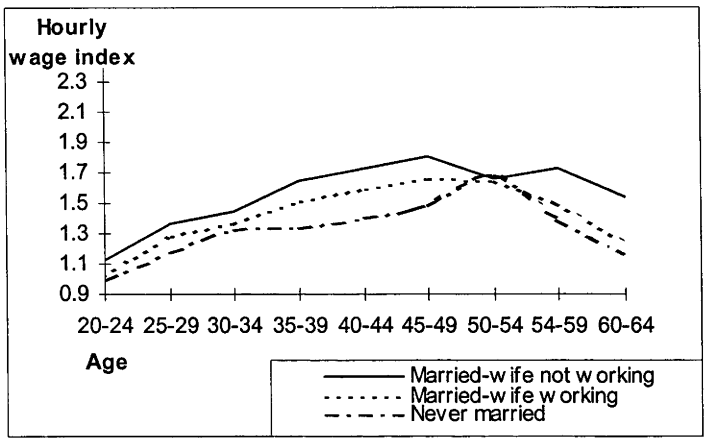
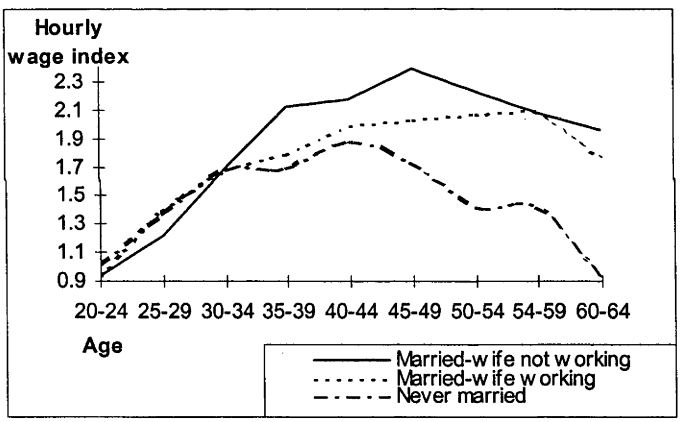


Figure 3.14: Wage-age profiles for men by degree of specialisation in marriage: USA 1991



Observation of the age wage profiles for the three most comparable data sets revealed that in each country the relationship between the age and wage rates of men tended to be concave. The hourly wage rate rose with age and peaked by the time the male was aged in his mid 50s[7]. When interpreting the relationship between age and average wages, in these cross sectional surveys, as indicative of the wages received by the average male over his working life we need to bear in mind the following caveats summarised in Thornton *et al.* (1997). Firstly, the

[7] These observations are consistent with human capital theory, which argues that as individuals age the amount of resources they devote to education and training falls. Eventually new human capital investment will no longer exceed the depreciation of existing human capital, and ultimately earnings tend to decline.

cross-sectional data ignores the inflation rate and the rate of general productivity growth in the economy. This implied that the working life wage increase suggested by the cross-sectional data will under-estimate the increase that a male currently aged 20 could expect to see over his working life. Furthermore the cohort can affect earnings in a number of ways. Welch (1979) suggested that men who are part of a large cohort (such as baby boomers) may experience lower earnings growth relative to workers in other cohorts.

Consider the three groups of men. In Australia 1989 the average wage of never married men reached its first peak for men aged 30-34. The hourly wage of never married men fell to a trough for men aged 50-54. It then rose again across the remaining age groups, ending at a wage rate quite similar to the earlier peak. The average wage of never married males in the Canada 1991 survey also rose to a peak for men aged 30-34. It then flattened out and rose again to another peak for men aged 50-54 before tailing off substantially. The hourly wage rate of never married men in USA 1991 also peaked at age 30-34. The second peak occurred for men ten years older. Following that the hourly wage tailed off to be close to zero for men aged 60-64.

These patterns highlight another problem associated with using cross-sectional data to analyse the longitudinal behaviour of never married males. It appears that the demographic characteristics of never married males (at least those related to income earning potential) could vary substantially with their age. A very small number of males remain unmarried over their working lives[8], and it seems that the probability of a male marrying could be related systematically to wage related characteristics. At least in the USA, males who marry in their early 30's tend to have low wage earning potential. More educated men, with relatively high wage earning potential, tend to marry in their mid to late 30's. In Chapter Four I construct age-wage profiles, controlling for human capital type demographics such as education, thus alleviating the problem.

[8] Appendix 3.A describes the proportion of males in the various marriage states over the working life.

The wage age profiles of married men were also concave. Hourly wages peaked earlier amongst married men without working wives. Their peak was achieved when men were aged in their 40s, whereas the peak for men with working wives occurred when the men were in their 50s.

The specialisation theory suggests that over their working lives married men should experience a larger net wage increase than that experienced by never married men. In terms of the figures the area between the graphed hourly wage lines for married men and never married men should be positive. In all countries that was definitely the case. While US and Australian married men without working wives tended to earn slightly less than never married men when they were aged less than 35, the reverse was true for older age groups[9]. In every age group Canadian married men earned more per hour than did never married men.

Furthermore specialisation suggests that the net wage increase of married males with working wives should exceed that of never married males. This also appears to be the case in the USA and Canada. Canadian men with working wives earned less than men with non-working wives in all age groups. American men older than 34, with non-working wives, earned more than did men whose wives worked. In net terms the hourly wages of married Australian men did not appear to vary with the labour supply of the wives.

While the gaps between the curves did tend to increase with age for US men, as specialisation predicts, they did not for Australia and Canada.

Over the working life the earnings gap between never married men and married men with working wives appears to be largest in the USA. There appears to be little difference between the corresponding Australian and Canadian earnings

[9] One explanation for this pattern is that the most specialised males forego earnings early in their careers for the opportunity to invest more heavily in human capital and/or receive more company specific training. Hill (1979) reported that married males spend more time in training on the current job than non-married males. More detailed analyses by Lynch (1992) confirmed that married males are statistically more likely to have received company or on-the-job training. A similar study by Bartel and Sicherman (1993) also found that marriage increased the likelihood of men receiving company and non-company training, holding constant other observable characteristics.
Another explanation is that the males have varying holdings of observed human capital such as education. I investigate this in Chapter Four.

gaps. I predicted that the Australian gap should be the smallest, but did not foresee any difference between Canada and the USA.

The earnings gap between married men appeared also to be largest in the USA. There may not even have been a corresponding Australian gap. I predicted that the Australian gap would be the smallest, but again did not predict a difference between Canada and the USA.

3.4.2 How have changes over time in specialisation been reflected in the progression of male wages over the working life? Australia (1981-1994); Canada (1981-1994); USA (1979-1994)

Appendix 3.E reports the hourly wage rates, in index form, of married and never married men over the working life for each country and year. Recall that the indexes were constructed by setting the average wage of the relevant unmarried group of men aged 20 – 24 to unity, in each data set. Graphs of the wage-age profiles for men differentiated by their degree of specialisation appear in figures 3.15 to 3.20. One cannot identify never married males in the Australia 1981, Canada 1981 and USA 1979 surveys. Unmarried males in these surveys include divorced, widowed and separated males. Since these males would have benefited from some years of specialisation whilst married it is reasonable to assume that never married males would experience a smaller net wage increase over their working life than that experienced by unmarried males as a whole. Indeed others have found that divorced, widowed and separated men earn a premium, but that it is smaller in size than the premium of currently married men (Hill, 1979; Bartlett and Callahan, 1984).

In section 3.3 I made three sets of predictions about changes to the wage-age profiles over time for each of the countries.

i) In terms of the number of years that the average man would have been married I argued that Australian and US men would have spent less time married, for a given age, in the more recent period. So I predicted that the gaps between all the

wage-age profiles for unmarried and married men would have decreased in size over time in both countries.

ii) In terms of the wife's attachment to the paid labour market I would expect that the cross-sectional labour supply of Canadian and US wives would be substantially more reflective of the couples' long-term specialisation commitment in the more recent period. Hence, we should observe that the gap between the age-wage profiles of married Canadian men and US men should have widened over time. But the gap between the profiles of unmarried men and married men with working wives should have diminished in size.

iii) In terms of sex based pay discrimination I argued that Australian and US wives would have experienced less discrimination in the more recent period. Canadian wives would have experienced much the same discrimination in both periods and may have experienced more in 1994. Hence, the Australian and US gaps between the wage-age profiles of never married men and currently married men should have decreased in size over time.

It is difficult to summarise the effects emanating from the three trends into one cogent prediction since we have no idea of the relative strengths of the effects caused by each of the trends. Assuming that the effect on specialisation, and hence wages, of each of the trends is identical in size enables one to add and subtract movements in age wage profiles. The only change for Canada should be a widening of the gap between the wage-age profiles of married men, and a shrinking of the gap between the profiles of unmarried men and married men with working wives. In Australia the gaps between each of the wage-age profiles should have diminished in size. For American men there should have been no change in the gap between the wage-age profiles of married men, but the gap between the profiles of unmarried men and married men should have decreased in size.

Firstly, consider changes over time in Australia. The Australian gap in the profiles of unmarried men and married men seems to have fallen in size, as did the gap between the profiles of married men. These observations are consistent with my predictions, in terms of the effects of specialisation.

The Canadian gap between the profiles of unmarried men and married men seems to have grown in size, while the profile gap between married men appears to have fallen. Both observations are counter to my predictions.

In the USA the gaps between all profiles seem to have increased in size over time. I had predicted that the gap between the profiles of married men would have increased, while the gap between the profiles of unmarried men and married men with working wives would have fallen. So, the predictions based on the effects of specialisation were partly met.

The hypothesised trends focus on the amount of specialisation. But there could also be cross-country and over-time differences in the return to specialisation related human capital. Increases in the return to education and experiences during the 1970's and 1980's in the USA led Juhn *et al.* (1993) to hypothesise that the driving force behind these changes was an increase in the return to all skills, unobserved included. It is possible, for example, that while the amount of specialisation undertaken by US men with working wives fell over time, the return to specialisation rose enough to outweigh the fall. This possibility is investigated in Chapter Five.

Figure 3.15: Wage-age profiles for men by degree of specialisation in marriage: Australia 1981

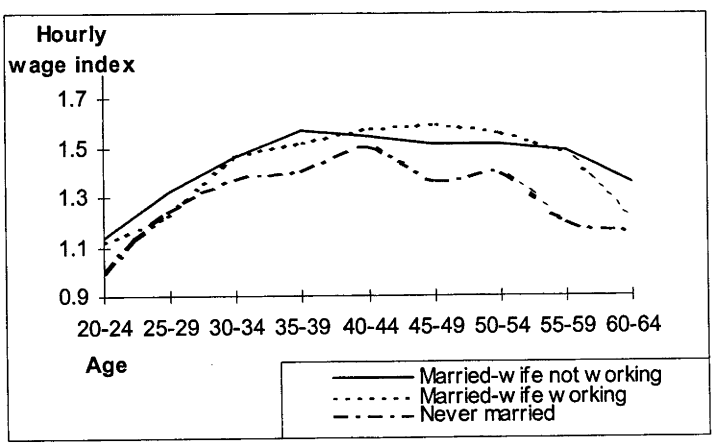


Figure 3.16: Wage-age profiles for men by degree of specialisation in marriage: Australia 1994

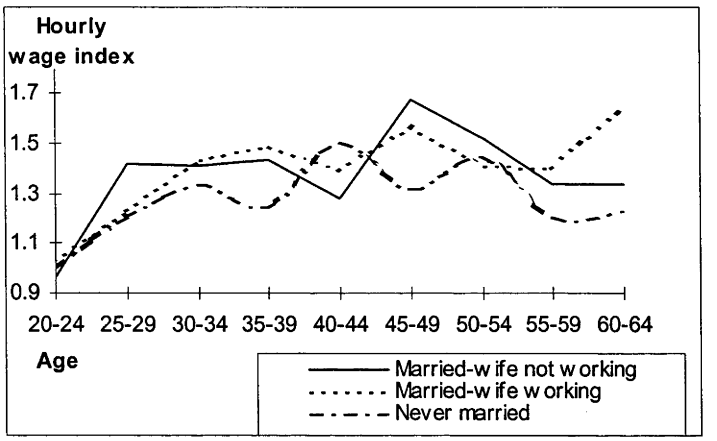


Figure 3.17: Wage-age profiles for men by degree of specialisation in marriage: Canada 1981

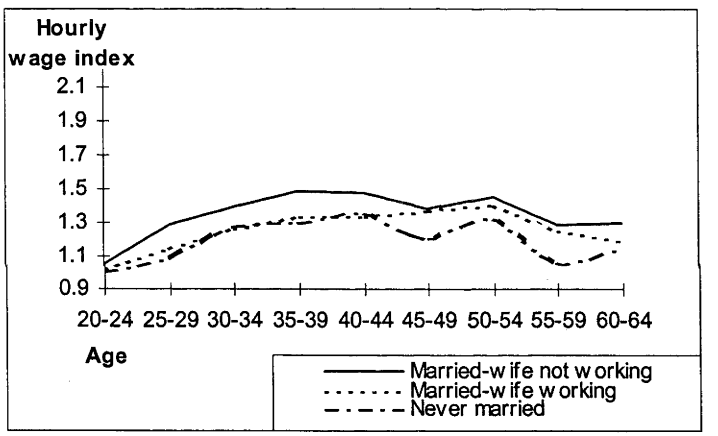


Figure 3.18: Wage-age profiles for men by degree of specialisation in marriage: Canada 1994

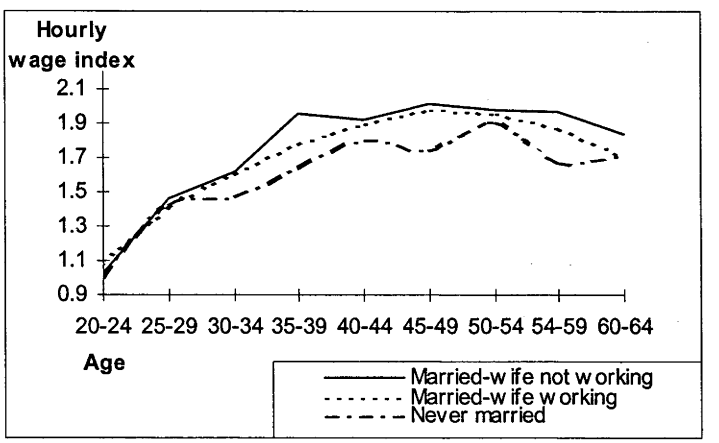


Figure 3.19: Wage-age profiles for men by degree of specialisation in marriage: USA 1979

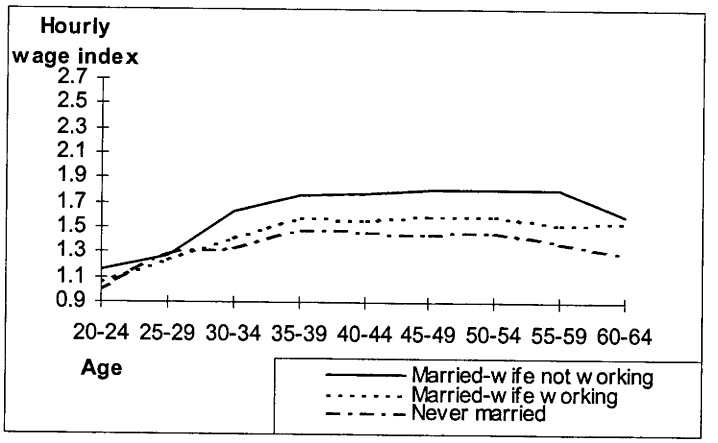
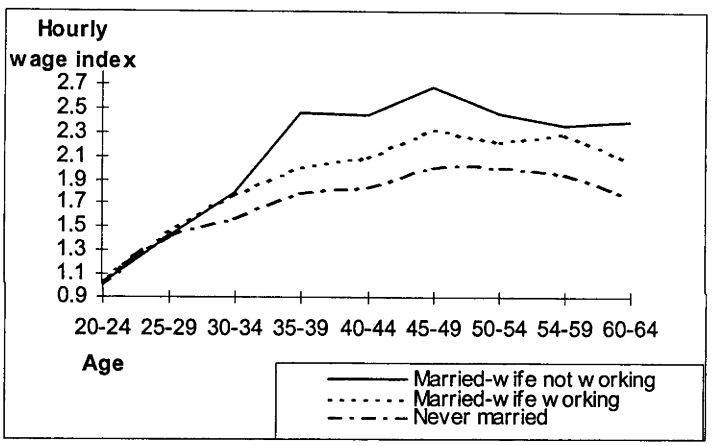


Figure 3.20: Wage-age profiles for men by degree of specialisation in marriage: USA 1994



3.5 Conclusion

In this chapter I introduced the data sets to be used in regression analysis in the remaining three chapters. I then used raw data from each of the data sets to illustrate how the progression of male wages over the male's working life varied with the male's hypothesised degree of specialisation. The specialisation theory suggests that the net increase in a male's wage over his working life should be greatest for men whose wives do not work. Next in size should be the wage increase of married males whose wives work with the wage increase of never married males being the smallest. This depiction of specialisation was found in the data for each country.

Section 3.2 introduced the surveys behind the LIS data sets and explained the samples used in further analysis. Having hypothesised in section 3.3 how specialisation might be depicted in age-wage profiles, section 3.4.1 compared those predictions with the age-wage profiles of men from Australia 1989, Canada 1991 and the USA 1991. Section 3.4.2 compared over-time predictions with actual profiles for Australia 1981 and 1994, Canada 1981 and 1994 and the USA 1979 and 1994.

Between country comparison highlighted that the Australian gaps between the working life wage increases of men, grouped by their degree of specialisation, were the smallest. This finding was expected, in terms of specialisation, since Australia exhibits the least amount of sex-based wage discrimination and the cross-section labour supply of Australian women is least reflective of their longer-term labour supply. The corresponding US gaps were largest although I did not predict any difference in size between the Canadian and US gaps.

Over time I observed that the gaps between the working life wage increases of men, grouped by their degree of specialisation, decreased in size in Australia. This is consistent with my predictions since gender based pay discrimination has decreased over time, as has the average length of time spent married.

Over the same time the gap in the working-life wage increased between married men with working wives and unmarried men increased in Canada and the USA. This finding was inconsistent with my hypothesis that the continuity of the labour supply of working wives had increased over time, thus ensuring that the labour supply of wives, at any point in time, was more reflective of the longer-term specialisation commitment of the couple. Furthermore the extent of sex based pay discrimination fell over the same period in the USA, reducing the impetus for couples to specialise.

The gap between the working life wage increases of married men with working wives and those with non-working wives increased over time in the USA and decreased over time in Canada. The US observation was consistent with predictions, but the Canadian observation was inconsistent.

One possible explanation for the counter-intuitive findings for the US and Canadian point in time comparison is that this analysis ignores the effect of the return to specialisation related human capital. That the US return to specialisation related human capital was higher than the Canadian return would explain why the US gaps in age-wage profiles were larger. Furthermore, the return to specialisation related human capital may have increased over time in the USA and decreased over time in Canada, thus explaining the over-time changes in the age-wage profiles. I considered these possibilities using more sophisticated empirical analysis. My findings are reported in Chapter Five. Before that, in Chapter Four, I consider whether controlling for observed human capital has any effect.

Appendix 3.A: Number of unmarried men working full-time full-year by age and country

	Australia*		Canada*		USA**	
Age group	1981	1994	1981	1994	1979	1994
20-24	297	107	161	111	156	540
25-29	243	126	181	270	204	1016
30-34	168	116	114	315	154	903
35-39	125	63	87	288	119	819
40-44	79	59	45	261	86	635
45-49	62	41	53	208	66	564
50-54	60	27	55	117	69	345
55-59	81	23	42	84	50	220
60-64	39	9	28	34	26	123

	Australia 1989***	Canada 1991***	USA 1991***
Age group			
20-24	124	105	71
25-29	173	184	177
30-34	108	138	118
35-39	63	93	79
40-44	32	51	40
45-49	14	34	34
50-54	17	19	22
55-59	14	16	12
60-64	6	10	5

*Those not currently in a de-jure marriage or in a de-facto relationship.
**Those not currently in a de-jure marriage.
***Those not currently in a de-facto relationship who had never been in a de-jure marriage.

Appendix 3.B: Marital Status by of Men Working Full-time Full-year by Age: Australia 1989, Canada 1991 and the USA 1991

Age group	Australia 1989		Canada 1991		USA 1991	
	Currently married	Never married	Currently married	Never married	Currently Married	Never married
	As a percent of all males in that age group (%)		As a percent of all males in that age group (%)		As a percent of all males in that age group (%)	
20-24	55.7	44.6	52.4	46.7	66.8	29.8
25-29	72.6	23.8	73.6	24.9	68.0	26.0
30-34	82.8	12.3	87.8	11.8	78.2	14.1
35-39	87.3	7.6	85.7	8.0	82.0	9.1
40-44	88.8	4.2	88.4	4.7	82.3	4.8
45-49	89.2	2.4	89.0	3.5	82.6	5.4
50-54	88.7	3.7	90.4	3.0	85.4	4.6
55-59	86.5	4.4	89.4	3.6	88.9	3.4
60-64	86.2	3.6	87.9	4.8	84.9	2.4

Appendix 3.C: Marital Status of Men Working Full-time Full-year by Age: Australia (1981, 1989), Canada (1981, 1991) and USA (1974, 1991).

Age group	Australia			Canada			USA		
	1981	1994		1981	1994		1979	1994	
	Currently married	Currently married	Never married	Currently married	Currently married	Never married	Currently married	Currently Married	Never married
	As a percent of all males in that age group (%)			As a percent of all males in that age group (%)			As a percent of all males in that age group (%)		
20-24	51.9	32.3	67.1	61.4	63.5	36.5	63.0	45.8	50.3
25-29	76.5	61.5	35.5	77.5	76.4	22.3	75.4	58.5	35.4
30-34	85.4	74.5	20.4	87.8	83.1	13.8	82.6	73.7	17.0
35-39	87.6	84.3	10.5	89.2	86.1	8.3	84.5	76.5	12.1
40-44	90.0	85.6	5.9	92.5	86.1	6.9	86.4	79.4	7.2
45-49	90.5	90.8	3.6	90.0	87.6	5.3	88.4	79.5	5.3
50-54	90.5	89.7	2.7	90.1	89.7	3.2	87.6	83.3	4.2
55-59	86.2	86.1	5.4	90.9	89.2	2.6	89.5	83.5	3.1
60-64	85.1	85.9	3.1	91.2	89.2	4.8	90.9	83.8	2.8

Appendix 3.D: Indexes of the Hourly Wage of Men Working Full-time Full-year by Marital Status and Age: Australia (1989), Canada (1991) and the USA (1991).*

	Australia 1989			Canada 1991			USA 1991		
Age group	Married - wife not working	Married - wife working	Never married	Married - wife not working	Married – wife working	Never married	Married – wife not working	Married - wife working	Never married
20 - 24	0.97	1.02	1.00	1.13	1.02	1.00	0.94	0.94	1.00
25 - 29	1.15	1.16	1.17	1.37	1.29	1.18	1.21	1.39	1.37
30 - 34	1.23	1.24	1.27	1.44	1.37	1.33	1.70	1.68	1.69
35 - 39	1.33	1.32	1.24	1.65	1.51	1.35	2.11	1.79	1.70
40 - 44	1.43	1.37	1.24	1.73	1.59	1.40	2.17	1.98	1.88
45 - 49	1.38	1.36	1.15	1.81	1.67	1.49	2.39	2.03	1.74
50 - 54	1.33	1.41	0.99	1.66	1.65	1.69	2.23	2.06	1.41
55 - 59	1.35	1.21	1.04	1.74	1.50	1.39	2.08	2.10	1.42
60 - 64	1.06	1.23	1.31	1.55	1.23	1.16	1.96	1.77	0.92

* In each country the hourly wage of never married/unmarried males working aged 20 - 24 is indexed to one and the hourly wage of other groups within that country is measured in reference to this base wage.

Appendix 3.E: Indexes of the Hourly Wage of Men Working Full-time – Full-year by Marital Status and Age: Australia (1981 and 1994), Canada (1981 and 1994) and the USA (1979 and 1994).

Age group	Australia 1981 Married - wife not working	Married -wife working	Not married	Canada 1981 Married - wife not working	Married –wife working	Not married	USA 1979 Married - wife not working	Married -wife working	Not married
20 - 24	1.14	1.12	1.00	1.06	1.01	1.00	1.16	1.06	1.00
25 - 29	1.32	1.23	1.24	1.29	1.14	1.09	1.28	1.24	1.28
30 - 34	1.47	1.48	1.37	1.40	1.27	1.28	1.63	1.42	1.33
35 - 39	1.57	1.52	1.41	1.49	1.34	1.30	1.76	1.59	1.48
40 - 44	1.55	1.58	1.50	1.48	1.33	1.36	1.78	1.56	1.48
45 - 49	1.52	1.59	1.36	1.38	1.37	1.21	1.80	1.60	1.44
50 - 54	1.51	1.56	1.40	1.45	1.40	1.32	1.81	1.60	1.47
55 - 59	1.49	1.48	1.21	1.29	1.25	1.06	1.81	1.53	1.38
60 - 64	1.35	1.21	1.16	1.30	1.20	1.14	1.59	1.55	1.30
Age group	Australia 1994 Married - wife not working	Married -wife working	Not married	Canada 1994 Married - wife not working	Married –wife working	Not married	USA 1994 Married - wife not working	Married -wife working	Not Married
20 - 24	0.96	1.03	1.00	1.03	1.07	1.00	1.02	1.02	1.00
25 - 29	1.42	1.23	1.21	1.46	1.41	1.43	1.43	1.45	1.42
30 - 34	1.41	1.44	1.33	1.61	1.60	1.48	1.79	1.77	1.57
35 - 39	1.43	1.49	1.25	1.96	1.78	1.64	2.46	2.00	1.80
40 - 44	1.28	1.39	1.50	1.92	1.90	1.80	2.44	2.10	1.84
45 - 49	1.68	1.58	1.32	2.01	1.98	1.75	2.69	2.32	2.02
50 - 54	1.53	1.41	1.45	1.98	1.95	1.91	2.47	2.23	2.01
55 - 59	1.34	1.41	1.21	1.96	1.87	1.67	2.37	2.29	1.96
60 - 64	1.34	1.64	1.23	1.83	1.71	1.73	2.40	2.08	1.78

* In each country the hourly wage of never married/unmarried males working aged 20 - 24 is indexed to one and the hourly wage of other groups within that country is measured in reference to this base wage.

CHAPTER FOUR

THE MALE MARRIAGE PREMIUM REVISITED

4.1 Introduction

This chapter reports on estimates of cross-country and over-time differences in the size of the marriage premium using cross-section data. I used the empirical findings of others, summarised in Chapter Two, and the empirical observations reported in Chapter Three to guide my construction of a set of hypotheses to be tested by empirical analysis. All the data sets described in Chapter Three were used in the analysis. Cross-country comparison was undertaken with Australia 1989, Canada 1991 and the USA 1991. Over-time comparison was made with Australia (1981 and 1994), Canada (1981 and 1994) and the USA (1979 and 1994).

The hypotheses tested by the empirical analysis presented here are listed below. Each of the hypotheses has implications for the relevance of sex based specialisation within marriage as an explanation for the marriage premium.

- the marriage premium was better described as the return to a quadratic in years married than the return to a marital status dummy;
- the return to marriage tended to be lower for men with working wives;
- the return to marriage was only lower for men with working wives if they were employed as management; and
- the return to marriage partly reflected the higher wages of fathers.

The empirical analysis involved the estimation of human capital based log wage equations, including indicator variables for married men, for men using the OLS technique. Once the existence of male marriage premiums was confirmed in each of the surveys, I tested the hypotheses by replacing the marital status indicator variable with explanatory variables relevant to the hypotheses.

Section 4.2 details the estimated male marriage premiums of all working men in Australia 1989, Canada 1991 and USA 1991, from log hourly wage equations controlling for age, ethnicity, location and education. The data sets at these times are most comparable. It shows that the most comparable group of men, in terms of the marriage premium, are those working full-time full-year.

Focussing on these men, section 4.3 unpacks the wage gap between married and unmarried men using the listed hypotheses. Section 4.4 replicates the empirical approach of the section 4.3 using comparable data from the most recent and oldest data surveys for each country; Australia 1981 and 1994, Canada 1981 and 1994 and the USA 1979 and 1994.

Conclusions are offered in section 4.5.

4.2 Comparing the Marriage Premiums of Australia 1989, Canada 1991 and USA 1991

In this section I report the estimated male marriage premiums for Australia 1989, Canada 1991 and the USA 1991. Although not the most recent LIS data sets for each country, they provide the most comparable samples and variables of interest. The estimated premiums were constructed from the estimated coefficient from an indicator variable set to one for currently married men.

Men included in the samples for estimation were aged 20 to 64 years and worked for wages and salaries in the survey week. Self-employed men were excluded from the samples, as were men with self-employed wives. Men working in the agriculture industry and the husbands of women working in the agriculture industry were also excluded. Divorced, widowed and separated men were excluded. In terms of marital status, the included men were either currently married, living in a de-facto relationship or had never been married.

The dependent variable in the analysis was the log of each man's hourly wage. As well as the indicator variable for currently married men the set of explanatory

variables included each man's; age[1], education, location[2] and ethnicity. Two indicator variables, describing attachment to the paid labour market, were also included. One was set to one for men who worked part-time in the reference week and the other set to one for men who worked full-time in the reference week, but did not work full-time for the entire year. A description of these variables appears in *Appendix 4.A*. Descriptive statistics are in *Appendix 4.B*.

The data sets did not include a measure of the hourly wage. To construct the hourly wage for men who worked full-time full-year I divided annual pre-tax earnings from wages and salaries by annual hours, basing annual hours on the number of hours worked in the reference week. For men who worked part-time in the reference week (less than 35 hours per week), or men who worked full-time in the reference week, but did not work full-time for the entire year the calculation was more complex and the resultant hourly wage less precise[3].

Regression results summarised in *Table 4.1* confirm the existence of the male marriage premium in these countries and years. The estimated coefficients on age, education, ethnicity and location were as expected. The estimated return to age was quadratic and concave in all countries. The estimated return to education

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[1] The data surveys do not contain measures of labour force experience. Nor do they contain measures of years of education. Instead they contain measures of the highest level of education attained. I used age to proxy experience, rather than potential years of experience (age - years of education - age left school). Since inter-country comparisons are an important part of the analysis I considered it more appropriate to use age as a proxy rather than potential experience, given the difficulties associated with allocating appropriate years of education to qualification in each country. However I have run regressions which allow the return to age to vary with education qualification. There was no significant change to the coefficients on the marital status dummy.

[2] The demographic controls for where the respondent lived were included to control for regional cost of living differences and other possible regional differences (such as discrimination).

[3] For men working full-time in the reference week, but who did not work full-time for the entire year:

mwge = (inc/((hrshd * weekhdft))

where mwge is the hourly wage, inc is the annual income from wages and salaries, hrshd is the number of hours worked in the reference week and weekhdft is the number of weeks worked full-time in the year relating to the income.

For men working part-time in the reference week:

mwge = (inc/((hrshd * (52 - weekhdft)) + (35 * weekhdft)))

tended to increased with qualifications, and compared with the return received by those without secondary education, was largest in the USA. Canadian and US men were rewarded financially for living in the largest urban areas, as were Australian men living in capital cities. Migrants, in both Canada and Australia, received wages significantly below non-migrants. The log wage of black American men was substantially lower than that of other men.

In each country, men working part-time in the reference week received significantly lower wages than did men working full-time full-year. Men who worked full-time in the reference week, but not for the entire year also earned less than men working full-time full-year, although this effect was insignificant at the ten per cent level in the USA. It is possible that the constructed measure of hourly wages under-estimates the true value for part-time workers or men working full-time part-year. Although the data sets contain measures of annual earnings they do not contain measures of annual hours worked and my estimate of annual hours may be over-stated.

The estimated marriage premiums[4] for Australia, Canada and the USA were 7.7 per cent, 13.1 per cent and 15.8 per cent respectively. There are three things of note regarding these estimated marriage premiums. Firstly their estimated significance, sign and relative size are consistent with those of Schoeni (1990). For each country, he estimated log annual earnings equations for full and part-time waged and salaried workers controlling for age, education, location and full-time employment for each country. His estimated marital status coefficients (between currently married males and never married, divorced, widowed and separated males) were 14.6 per cent (Australia, 1981), 15.1 per cent (Canada, 1981), and 35.8 per cent (USA, 1979).

[4] The premiums are calculated thus: $e^{(\text{coefficient on marriage dummy})} - 1$.

Table 4.1: The coefficients from OLS estimation of the log hourly wages of currently married and never married men with t-statistics in brackets. #

	Australia 1989	Canada 1991	USA 1991
Constant	1.450	1.253	0.467
	(1.300)	(13.041)	(4.666)
Married	**0.074**	**0.123**	**0.147**
	(4.208)	**(5.727)**	**(6.564)**
Age	0.045	0.054	0.066
	(11.343)	(11.040)	(12.985)
Age squared	-4.907E-04	-5.522E-04	-6.478E-04
	(-10.298)	(-9.536)	(-10.670)
Ethnicity	-0.071	-0.069	-0.172
	(-4.800)	(-3.714)	(-6.019)
Location	0.042	0.068	0.170
	(3.373)	(4.973)	(10.613)
Education			
Tertiary	0.358	0.407	0.642
	(20.530)	(17.904)	(25.467)
Certificate/Diploma	0.204	0.218	0.448
	(11.750)	(11.212)	(13.173)
Post-secondary	0.104	0.135	0.381
	(7.030)	(4.668)	(14.385)
Secondary	0.116	0.133	0.304
	(5.906)	(6.617)	(12.770)
Working full-time, part-year	-0.163	-0.112	-0.030
	(-7.382)	(-5.138)	(-1.550)
Working part-time	-0.180	-0.625	-0.798
	(-6.281)	(-22.388)	(-24.044)
Adjusted R squared	0.1485	0.1619	0.2889
N° of observations	5294	7480	6118

The data used for estimation is summarised in *Appendix 4.B.*

Secondly the male marriage premium was a relatively important explanator of male wages. In the Australian regression the marriage premium represented nearly twice the addition to the hourly wage that a male would receive from living in a capital city. In the USA the return to being married almost corresponded in size to the penalty in the hourly wage experienced by black Americans. The Canadian marriage premium represented a slightly smaller addition to hourly wages than that accruing to a male with secondary education or post-secondary education over a male who had not graduated from secondary school.

Thirdly the size of the premium was remarkably consistent across countries when account was taken of the relative dispersion in wages. If married men were more productive than never married men were; international differences in the degree of wage dispersion may reflect differences in the wage structures or return to human

capital. Variation in wage dispersion tends to be indicative of variations in the return to human capital[5]. Cross-country differences in the return to specialisation related human capital are explored further in Chapter Five. In the mean-time one measure of the dispersion in wages is the ratio of the standard deviation of the log wage to the mean of the log wage. This was 0.17, 0.23 and 0.27 in Australia, Canada and the USA respectively. The marriage premiums were re-weighted, assuming that this dispersion was caused entirely by international differences in the return to human capital, and that the return to marriage related human capital and other observed human capital (like eduction) follow the same trends. I assumed that the US wage dispersion was evident in Australia and Canada. The wage dispersion adjusted marriage premiums were 12.2 per cent, 15.4 per cent and 15.8 per cent in Australia, Canada and the USA respectively.

4.3 Unwrapping the Marriage Premium in Australia 1989, Canada 1991 and USA 1991

Unwrapping the premium differences between countries may help with assessing the appropriateness of the specialisation supposition. In this section I summarise empirical analysis that considered whether:

- the premium of men working full-time full-year was larger than for men working part-time or full-time part year;
- the premium could be explained by years married;
- men with working wives received a lower premium;
- men who worked as managers received a higher premium and were penalised more by having a working wife; and
- the size of the premium differed with the presence of dependent children.

[5] For example, Blau and Kahn (1996a) found that a significant proportion of cross country differences in that part of the male female wage gap apportioned to discrimination could be explained by international variations in the degree of wage dispersion due to wage structure.

In each of the sections relating to these hypotheses I discuss their relationship with the specialisation supposition.

I firstly re-estimated the regressions discussed in the previous section, allowing the marriage premium to differ with the men's attachment to the labour market. Then I restricted the samples to men who worked full-time for the entire year and estimated regressions controlling for the factors relating to the other listed hypotheses.

Did part-time workers earn a marriage premium?

Most empirical studies of the male marriage premium have analysed men working full-time. But, Schoeni's (1990) analysis included part-time employees and assumed that the part-time premium would not differ from the full-time premium. The specialisation hypothesis suggests that the married male has more opportunity to invest in wage enhancing human capital and more energy with which to undertake his paid work. In terms of time availability it seems that men working part-time should receive a lower marriage premium, if one at all. Part-time workers would be less time constrained than full-time workers. In terms of energy available for work in the paid labour market, it also seems that the premium of part-time workers would be smaller. Married men who worked part-time would have time to do more tasks within the home and, if they did do more work within the home, would have less energy to use in their paid jobs than unmarried men working part-time. In addition, studies such as Wellington (1993) find that human capital skills appear to be acquired only in full-time positions so it would be difficult to make use of specialisation opportunities.

However, if two other explanations for the marriage premium, selection and discrimination were in operation part-time workers should receive the same sized premium as full-time workers. The selection argument claims that married men are more productive before they marry. Discrimination, on the other hand, derives from employer behaviour and there is no reason to believe that employers would maintain different pay relativities between married and unmarried men on the basis of the hours they worked.

I re-estimated the regressions discussed in section 4.2, allowing the marriage premium to vary with the male's employment status through interaction terms of the marital status and employment status dummies. The coefficient estimates from this specification appear in the first column of each country table of *Appendix 4.C*. The estimated premiums are reported in *Table 4.2*. Consistent with the above interpretation of the specialisation hypothesis, USA and Australian part-time workers do not receive a premium. In fact Australian part-time workers are penalised by marriage. However Canadian part-time workers receive the same premium as full-time full-year workers. Men working full-time part-year receive a substantially lower marriage premium in Canada, the same size premium in the USA and a substantially higher premium in Australia.

Table 4.2: Estimated marriage premiums for men grouped by their employment status

	Australia 1989	Canada 1991	USA 1991
Working full-time full-year	7.6	14.7	17.6
Working part-time	-13.0	14.7	0.3
Working full-time part-year	20.8	1.9	17.6

However, these results suggests that, as a group men who do not work full-time full-year received a lower premium than did men working full-time full-year. I excluded part-time workers and those working full-time part-year from the remaining analysis and focused on the marriage premium for males working full-time full-year.

The marriage premium for men working full-time full-year

Column two of each country table in *Appendix 4.C* summarises the results of OLS estimation of the full-time full-year sample including an indicator variable for currently married men - specification one. The marriage premiums for males working full-time full-year in Australia, Canada and the USA were 8.5 per cent, 15.3 per cent and 17.1 per cent respectively.

Column three of each country table in *Appendix 4.C* lists the estimated coefficients from specification two, which allowed the age earnings profiles of married males and never married males to differ, and included dummy variables set to one for married males with working wives.

Column four of each country table in *Appendix 4.C* reports the estimated coefficients from specification three, which allowed the premium to differ for married men by; age, whether their wife worked, whether they had dependent children, and whether they were employed as managers. I also tested whether the working wife penalty applied differently to managers. In each of the countries most of the men with dependent children were married, so I did not include dummy variables for all men with dependent children. However I did include a dummy variable for all managers. I also tested whether black Americans received a smaller premium than other American men.

The estimated premiums[6] for each group of married men, calculated from specification three, are reported in *Table 4.3* for men aged 30 and men aged 45. *Figures 4.1* to *4.3* illustrate how the premiums evolved over the men's working lives for Australia, Canada and the USA respectively. For men aged 35, the premiums were much the same size in each country. However, by age 45, the US premiums were by far the largest and the Australian premiums the smallest. This suggests that it takes time for the productivity effects to develop, as the specialisation hypothesis would have us believe.

Table 4.3: Estimated marriage premiums for men working full-time full-year depending on the employment status of wives, the presence of dependent children and the man's occupation (%)*

	Australia 1989		Canada 1991		USA 1991	
	aged 30	Aged 45	aged 30	aged 45	Aged 30	aged 45
With working wives	8.0	12.3	5.6	12.4	7.0	35.6
Managers	21.3	26.1	25.7	33.8	10.5	40.0
With non-working wives	8.0	12.3	13.3	20.6	7.0	35.6
With children aged < 6	8.0	12.3	17.0	24.5	7.0	35.6
With children aged 6+	11.1	15.5	17.6	25.2	7.0	35.6
Managers	21.3	26.1	34.9	43.5	32.3	67.7

* Specification three, *Appendix 4.C.*

Did the wage-age profile differ by marital status?

In cross-section analysis on US data researchers, such as Schoeni (1990), Korenman and Neumark (1991) and Gray (1997), found that the number of years

[6] The premiums are calculated from the exponential of the gap in the predicted log wages of married and unmarried men, using the estimated coefficients reported in Appendix 4.C. Only estimated coefficients significant at the ten per cent level are included in the calculations.

that a man has been married, and its square, were more effective controls for marital status effects on wages than were marital-status dummies. They found that married men experienced faster wage growth than unmarried men over their married lives. Such a finding is consistent with the specialisation hypothesis, which supposes that married men accrue human capital more rapidly, while married, than unmarried men. Men who selected into marriage on the basis of high levels of unobserved productivity should not experience productivity growth after marriage.

In the LIS data sets there was no measure of time spent married. I proxied the differential accrual rates of human capital effect as differential age earnings profiles. However I also used age also to proxy work experience. As explained in Chapter Three, cross- country comparison of the effects of specialisation will be problematic if the relationship between age and the length of marriage varied from country to country. In that case the return to age would absorb different proportions of the marriage premium in each country. Furthermore, the education qualification may well be related to the length of marriage for a given age (via age at first marriage or likelihood of divorce and re-marriage). This would be problematic if the education mix of males varied between the countries. Consequently return to age would absorb varying amounts of the return to specialisation depending on the country.

In all countries the estimated wage increment to age proved to be higher for married males in specifications two and three. In Australia and Canada it was a linear shift. In the USA it was a quadratic shift. These findings are consistent with the observations of raw wages discussed in Chapter Three.

Did married men with working wives earn less than did married men with wives who did not work?

As I explained in Chapter Two, researchers tend to assume that the amount of time the wife spends in the paid labour market is indicative of a couple's degree of specialisation. The more time the wife spends in the paid labour market the less specialised is her marriage. Gray (1997), for example, found such a

relationship between the wives' labour supply and husbands' earnings in US cross-section data covering the late 1970s and early 1990s.

In all countries the estimated coefficient on the working wife dummy in specification two was negative and significant at the ten per cent level. The percentage effect on men's hourly wages was largest in Canada and smallest in Australia. The estimated coefficients were -0.022, -0.077 and -0.055 for Australia, Canada and the USA respectively. Again these findings are consistent with the raw wage observations of Chapter Three.

Figure 4.1: Marriage premiums over the working life: Australia 1989

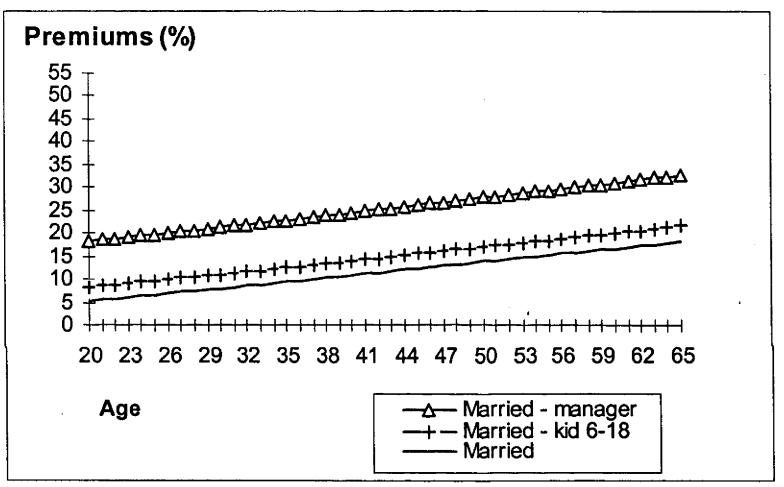


Figure 4.2: Marriage premiums over the working life: Canada 1991

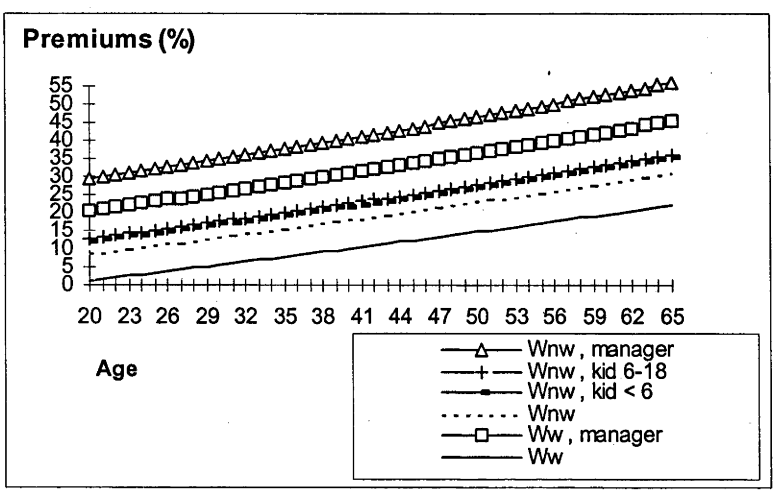
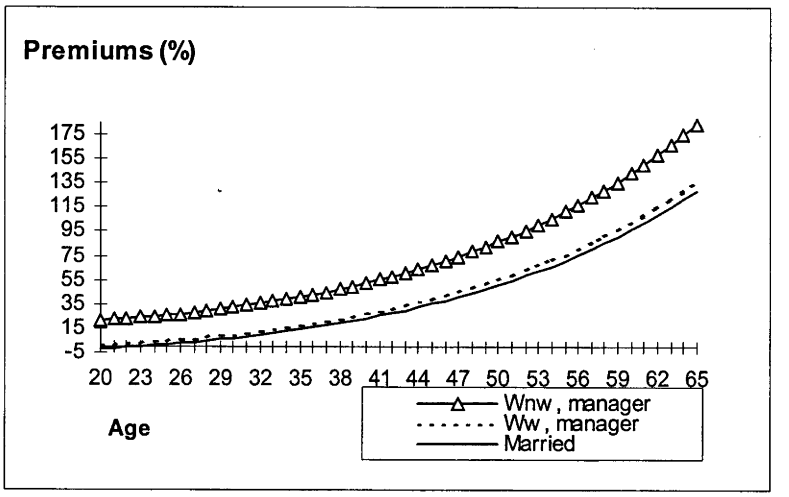


Figure 4.3: Marriage premiums over the working life: USA 1991



Did married men with dependent children earn a larger premium?

Loh (1996) observed that an element of the US marriage premium, he estimated using 1990 cross-section data, was related to the presence of dependent children. Korenman and Neumark (1991) and Cornwell and Rupert (1997) confirmed this finding with US data from the 1970s.

In terms of specialisation the effect of the presence of dependent children is a complex issue. Wives' labour supply, the measure of specialisation used in this thesis, depends on the presence of children. Knudsen and Peters (1994) showed, for Australia, Canada and the USA, that married mothers were less likely to work and worked fewer hours than childless wives did. Mothers with pre-school aged children were most likely to withdraw their labour.

Given the difficulties associated with combining employment, especially full-time employment, with the responsibility for dependent children, couples might be more inclined to specialise when they have children. One sign of increased specialisation is a reduction in the hours the wife spends in the paid labour market. By only considering couples in which the husband works full-time I do not allow for the possibility that the husband reduces his hours significantly in response to the arrival of a child. As the wife reduces her hours of paid work she

might also take more responsibility for other household duties. Under this line of argument the presence of children would have no effect on the marriage premium, since the specialisation response was absorbed into the wife's labour supply response. However it is also probable that the wife reduces her hours to take on the child-care responsibilities, but does not absorb responsibility for the other housework. In this case the presence of children would have a negative effect on men's wages.

Consider also the option that the new mother maintains her degree of attachment to the paid labour market, in terms of the hours worked, but expends less energy on the job as she takes on the prime responsibility for the child. As she does this she might also take on more of the other housework. This means that the presence of children would have a positive effect on men's wages. On the other hand, given her time constraints the husband might reduce his effort in the paid labour market to assist with the new demands of parenthood, so that parenthood had a negative effect of men's wages,

I turn to the data analysis for an answer to which response to parenthood is most common. Adding dependent children as a regressor had little effect on the relationship between wives' labour supply and husbands' wages. In terms of the direct effect of children on the marriage premium I found that US men received the same premium regardless of the presence of dependent children. However Canadian husbands with dependent children earned a larger premium than married men without children did. So too did Australian husbands with school aged dependent children.

Because the effect of dependent children is nowhere negative it seems that fathers, who do not respond to parenthood by moving from full-time to part-time employment, do not expend any less energy in the paid labour market than married men without dependent children.

Knudsen and Peters (1994) concluded that the effect of dependent children on wives' labour supply was smallest in the USA. Given my finding that dependent children have no effect on the US marriage premium, this suggests that wives are relatively unlikely to respond to the presence of children by reducing their labour

supply. Those that maintain their attachment to the paid labour market do not tend to take on any more responsibility for other housework. But they take on as much of the remaining housework as wives without children.

Canadian and Australian women were more likely to exit the labour market on the birth of a child. Furthermore, all Canadian women with children seemed to take on more housework than wives without children did. This was also the case for Australian women with school-aged children.

Did men working in management jobs[7] earn a larger premium?

A small US management theory literature has been researching the relationship between wives' employment status and husband's wage for men working in management (see Jacobsen and Rayack, 1996, for a survey). Some of the justifications expounded by these researchers for their observations of a negative relationship between husband's wages and wives' hours parallel the specialisation hypothesis. However they also argue that wives can make direct investment into their husbands' careers. Furthermore, managers are seen to be more able to take advantage of specialisation and direct investment from their wives than are men in other occupations. This literature has spawned a number of economics based studies on whether the relationship between wives' employment status and husband's earnings is affected by the occupation of the husband.

Jacobsen and Rayack (1996) found, in cross-section analysis, of the US PSID for the 1984 to 1989 waves that the relationship between wives' working hours and husbands' hourly earnings was significantly larger for men working as managers. Similarly Hotchkiss and Moore (1999), using a cross-section of families from the March 1993 US Current Population Survey, found that the negative relationship between wives' hours and husbands' hourly earnings was roughly three times the size of the relationship for non-managers.

I found that Australian managers in general earned more per hour than non-managers. However Canadian and US men working as managers did not, in

[7] I use Hotchkiss and Moore's (1999) definition of management jobs for the USA for consistency. Jacobsen and Rayack (1996) do not provide their definition.

general, earn more than non-managers. In all countries the estimated marriage premium of managers was larger than the marriage premium of non-managers, but non-managers still received a sizeable premium. Canadian men suffered the same working wife-penalty, regardless of their occupation. However, in the USA the estimated working wife penalty was restricted to managers. Non-managers were not penalised by having a working wife. The Australian findings were inconclusive. The inclusion of the interaction term between married managers and husbands with working wives caused the estimated coefficient on the working-wife term to become insignificant at the ten per cent level. But, the estimated coefficient on the working wife and married manager interaction term was also insignificant at the ten per cent level.

Did black Americans earn a smaller premium?

American studies of the male marriage premium mostly restrict their analysis to non-black Americans. Black Americans supposedly receive a lower premium, although few studies have proven this. Blackburn and Korenman (1994) estimated that the black premium was slightly lower than the white premium over the period 1976 to 1988. My estimations suggest that black Americans received the same size premium as the rest of American men.

Why was the US marriage premium the largest?

The US component premiums for men aged 45 are larger than are the Australian and Canadian equivalents. However, for men aged 30 this is not the case. Early in their marriages Australian and Canadian men tend to earn premiums larger than their US counterparts. It seems that the American premium advantage over Australia and Canada evolves over the men's working and married lives. This also supports the specialisation argument.

4.4 The Marriage Premium Over Time in Australia (1981-1994), Canada (1981-1994) and USA (1979-1994)

In this section I report on empirical analysis, identical to that presented in section 4.3, of two data sets for each country: Australia (1981 and 1989), Canada (1981 and 1991) and the USA (1974 and 1991). I used consistent samples and control variables in both years for each country. However the samples and control variables are not consistent across countries. Nor are the time periods; being twelve years for Australia[8], thirteen years for Canada, and fifteen years for the USA. The point of this section is to make over time comparisons of the marriage premium within each country. Differences in over-time trends between countries may merely reflect differences in the samples used for estimation or in the variable definitions. The variable definitions are listed in *Appendix 4.A* and the summary statistics in *Appendix 4.D*.

Table 4.4 compares the country samples used in estimating log wage equations for males working full-time full-year in Canada and the USA and full-time for Australia. The American data sets are most close to the ones discussed in the previous section. In all countries the samples contain men aged 20 to 64 working full-time in the reference week. The Canadian and US samples are restricted to men working full-time full-year. Currently married men include men in de-facto couples in Australia and Canada. In all countries unmarried men include never married men and divorced, widowed and separated men. Research shows that divorced, widowed and separated men as a group receive a premium, but that premium is smaller than the premium received by currently married men (Blackburn and Korenman, 1994).

Loh (1996) noted that the wage rate used affected the size of the estimated marriage premium in the 1990 wave of the US NLSY. He found that the estimated marriage premium was higher when the wage was calculated as the rate of annual earnings to annual hours worked, than if the wage rate was based on hourly wage rates calculated from weekly data. This suggests I should be cautious of changes

[8] The 1994 earnings data was collected over the calendar year 1994, while the 1981 earnings data was collected from September to December 1982.

over time in Canada and the USA because the wage rates in the more recent surveys were based on annual earnings but the wage rates in the earlier surveys were based on weekly earnings.

Table 4.4: Members of the samples by country and year

Australia 1989 Canada 1991 USA 1991		Australia		Canada		USA	
		1981	1994	1981	1994	1979	1994
✓	Men aged 20-65	✓	✓	✓	✓	✓	✓
✓	Currently married includes men in defacto relationships	✓	✓	✓	✓		
	Unmarried includes divorced, widowed and separated	✓	✓	✓	✓	✓	✓
	Unmarried includes men in defacto relationships					✓	✓
✓	Unmarried is never married. Divorced, widowed and separated excluded from analysis						
✓	Men working in agriculture excluded	✓	✓			✓	✓
✓	Husbands of women working in agriculture excluded	✓	✓			✓	✓
✓	Self-employed men excluded			✓	✓	✓	✓
✓	Husbands of self-employed women excluded			✓	✓	✓	✓
✓	Working full-time	✓	✓	✓	✓	✓	✓
✓	Working full-time full-year			✓	✓	✓	✓
	Hourly wage based on weekly earnings* and hours worked in that week	✓	✓	✓		✓	
✓	Hourly wage based on annual earnings* and annual hours worked				✓		✓
✓	Controlled for education and age	✓	✓	✓	✓	✓	✓
✓	Controlled for ethnicity					✓	✓
✓	Controlled for location	✓	✓	✓	✓	✓	✓

* Earnings from wages and salaries

The marriage premiums by country and year

The estimated coefficients from OLS regressions analogous to the three specifications discussed in the previous section are recorded in *Appendix 4.E.*

Table 4.5 lists the estimated marriage premiums by year and country (first specification). The size of the Australian and Canadian premiums decreased between the early 1980s and mid 1990s. However the size of the US premium for currently married men compared with never married, divorced, widowed and separated men remained much the same. Gray (1997) found that the US premium for currently married men compared with never married men decreased in size from 10.6 per cent in the late 1970s to 5.8 per cent in the early 1990s. He also found that the premium for divorced, widowed and separated men was 9.5 percent in the late 1970s and only 2.9 per cent in the early 1990s. Unfortunately the wage rate measures were not consistent in the two US surveys. This may be the cause of my incompatible finding.

Table 4.5: Marriage premiums over time for male wage and salary earners (%)

	Australia		Canada		USA	
	1981	1994	1981	1994	1979	1994
Marriage premium	14.9	6.5	14.3	8.3	13.1	14.1

Did the wage-age profile differ by marital status?

In the second specification, the estimated coefficients on age and age squared interacted with marriage suggested that married men earned more per year of marriage in both time periods in Canada and the USA, and in the first Australian time period. The estimated relationships between marriage and age were quadratic and concave. There was no evidence of this form of specialisation in Australia 1994.

Was there a working wife penalty?

Estimation of the second specification also suggested that there was a working wife penalty for both time Canadian and US time periods and the first Australian time period, in the second specification. The estimated coefficients on the working wife indicator variable are reported in *Table 4.6*. Gray (1997) found that between the late 1970s and the early 1990s the US working wife penalty decreased in size. In all countries the working wife penalty decreased in size. In

fact there was no working wife penalty in Australia 1994. Combined with the finding on the wage-age profiles this suggests that there is no evidence of specialisation in Australia in the mid-1990s. Between the early 1980s and the mid-1990s specialisation has disappeared.

Table 4.6: Estimated coefficients on the indicator variable for working wives (specification 2)

Australia		Canada		USA	
1981	1994	1981	1994	1979	1994
-0.070*	-0.020	-0.108*	-0.037*	-0.112*	-0.071*

* significant at 5 per cent level

The estimated premiums for each group of married men (aged 45) calculated from the coefficient estimates for specification three, are reported in *Table 4.7*. *Figures 4.4* to *4.9* show, for each country and time period, the evolution of the premiums by age.

Managers received the same working wife penalty as non-managers in Canada in both periods. The working wife penalty was more substantial for US managers, but non-managers earned a lower premium if their wife worked. I was not able to identify managers in the Australia 1981 data set.

Table 4.7: Marriage premiums for men aged 45 (specification 3) (%)

	Australia		Canada		USA	
	1981	1994	1981	1994	1979	1994
with working wives	10.9	5.8	12.7	6.7	11.2	14.0
managers	N/A	N/A	12.7	6.7	3.8	22.5
with non-working wives	18.5	5.8	25.3	10.0	23.1	19.1
with children aged < 6	18.5	5.8	25.3	10.0	23.1	19.1
with children aged 6+	18.5	5.8	10.9	10.0	23.1	11.9
managers	N/A	N/A	25.3	10.0	23.1	49.4

Did married men with dependent children earn a larger premium?

Estimating the relationship between dependent children and the marriage premium proved to be problematic for these data sets. Divorced, widowed and separated men were included in the unmarried category and US men living in de-facto relationships were reported as unmarried. Some of these men had children so I included indicator variables for men with dependent children regardless of

whether they were married, as well as the dependent children indicator variables for married men.

The presence of children did not have a significant effect on Australian men's wages in general. Nor did the presence of children affect the size of the marriage premium. The same could be said for Canada 1994.

However, in both US data 1979 and US 1994, and Canada 1994, men living with dependent children earned significantly more than childless men, if the children were aged six or more. It seems that the dependent child dummy has identified US men living in de-facto relationships and divorced, separated and widowed men. These men should receive a marriage premium.

Logically the marriage premium of men with older dependent children must then be adjusted downward. And the effect of older dependent children on the marriage premium was negative for men in both US samples and the Canada 1994 samples. However the size of the negative coefficients on the marriage premium for men with older dependent children tended to be smaller than the addition to wages received by all men with older dependent children. This could be interpreted two ways. Perhaps men with older dependent children were more likely to specialise. Or the premiums received by divorced, widowed and separated men (and US men living in de-facto relationships) were smaller than the premiums received by currently married men.

Data limitations meant that it was not possible to determine over-time changes in the effect of dependent children on the male marriage premium. This is disappointing because it would have been interesting to see whether couples with children have changed the way they arrange their lives. Bianchi (2000) tells us that American time-use data show that over time men have been spending more time with their children.

Did men working in management jobs[9] earn a larger premium?

I was not able to consider this issue for Australia because the Australia 1981 data set did not differentiate managers from other occupations. Canadian and American men working in management earned more than other men did in both time periods. Managers received larger marriage premiums in Canada 1981 and the USA 1994.

In both US data sets the estimation suggests that managers experienced a larger working wife penalty than non-managers did. However non-managers also experienced a working wife penalty. Canadian married men suffered the same working wife penalty regardless of whether they were managers. It is possible that my classification of Canadian managers was inappropriate. It would be interesting to undertake further analysis to determine whether the managers' working wife penalty is only a US phenomenon.

Black Americans and the premium

In both years the estimated premium received by black American men was the same size as that received by other American men. These findings suggest that the standard approach to remove black Americans from analyses of marriage premiums may be uncalled for.

Changes over time?

Recall that *Table 4.5* shows that the reduction in the size of the Australian marriage premium, for all men, between the 1981 and 1994 data sets was 8.4 percentage points. *Table 4.7* illustrated that for Australian men aged 45 the premiums of those with working wives were 5.1 percentage points higher in 1981 than in 1994. However, men with non-working wives received a premium 12.7 percentage point higher in the 1981 sample than they did in the 1994 sample. In terms of the specialisation hypothesis one could argue that there was a reduction in the degree of specialisation amongst all married men, and/or a reduction in the

[9] I use Hotchkiss and Moore's (1999) definition of management jobs for the USA for consistency. Jacobsen and Rayack (1996) do not provide their definition.

return to specialisation. Furthermore men in the 1994 sample did not benefit from the further specialisation opportunities afforded by having wives who do not work in the paid labour market. It could be argued that Australian couples in the mid-1990s did not undertake any form of specialisation. Not only was there no evidence of the working wife penalty, but the age-wage profiles of unmarried men were identical to those of married men. However the sample used for estimation included divorced, widowed and separated men in the unmarried category. Analysis presented in chapters five and six focused on the differences between currently married men and never married men.

The Canadian premium, for all men, reduced in size by six percentage points between 1981 and 1994. At age 45 the premium for men with working wives was six percentage points higher in 1981 than in 1994. However for men without working wives the fall in the premium was about 15 percentage points. As in Australia, the explanation in terms of the specialisation hypothesis could be that married couples undertook less specialisation in 1994 and/or received less return on that specialisation. Although couples including wives, who did not work, still took advantage of the added opportunity to specialise in 1994 their extra specialisation was less marked.

The US marriage premium was much the same size in the 1979 and 1994 data sets. I had expected to see a fall in its size, but this effect might have been obscured by the fact that the wage measure used in estimation was not consistent, and that men in de-facto relationships were included in the unmarried category. However, the component premiums for men aged 45 did vary in size. Men with working wives received a slightly larger premium in 1994. It is possible that married men have increased their intensity of specialisation. However we also know that the US return to observed human capital increased over much the same time period (Juhn, *et al.*, 1993; Card and Lemieux 1996). Furthermore Gray (1997) claims that the return to specialisation related human capital increased over the 1980s. In contrast, apart from managers, men whose wives were not working received significantly larger premiums in 1979 than they did in 1994. In line with the Canadian and Australian conclusions, I argue that couples including non-working wives were less inclined to specialise.

Figure 4.4: Marriage premiums over the working life: Australia 1981 and 1994

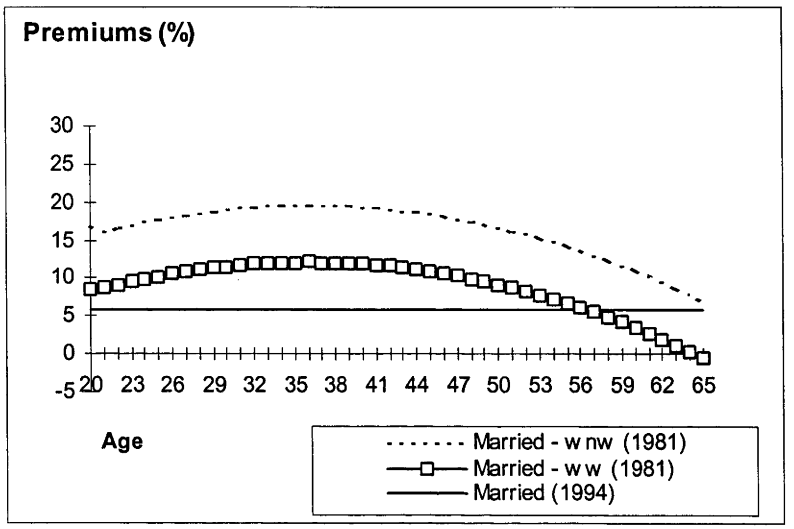


Figure 4.5: Marriage premiums over the working life: Canada 1981

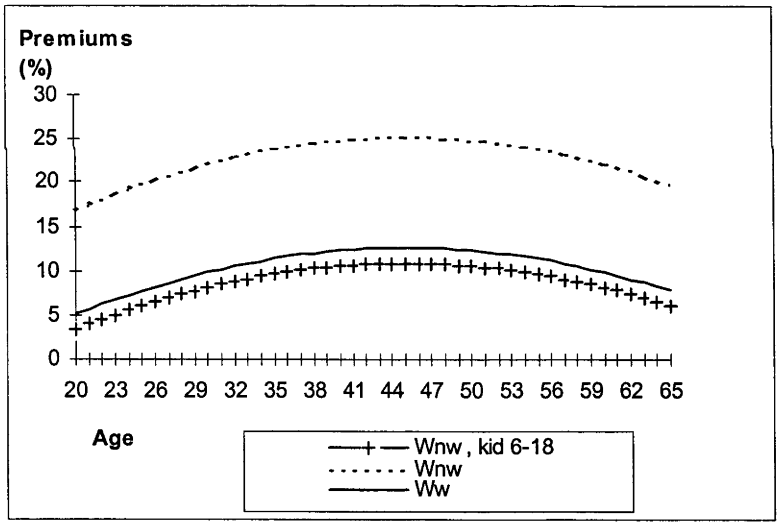


Figure 4.6: Marriage premiums over the working life: Canada 1994

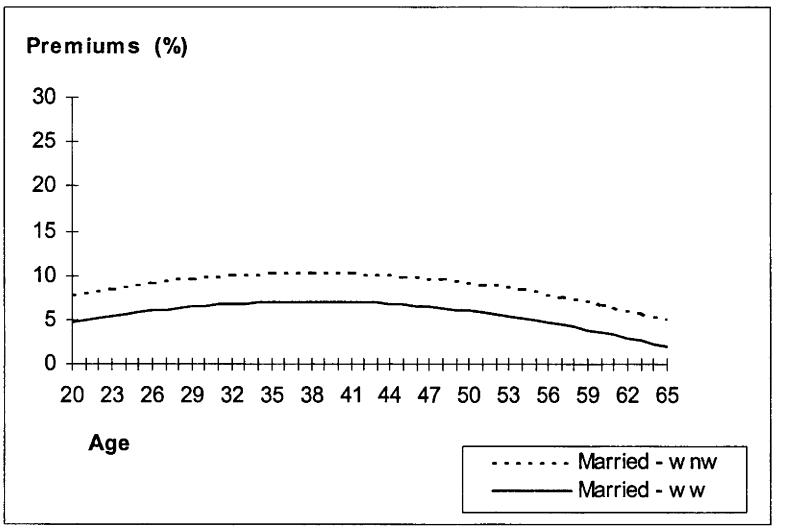


Figure 4.7: Marriage premiums over the working life: USA 1979

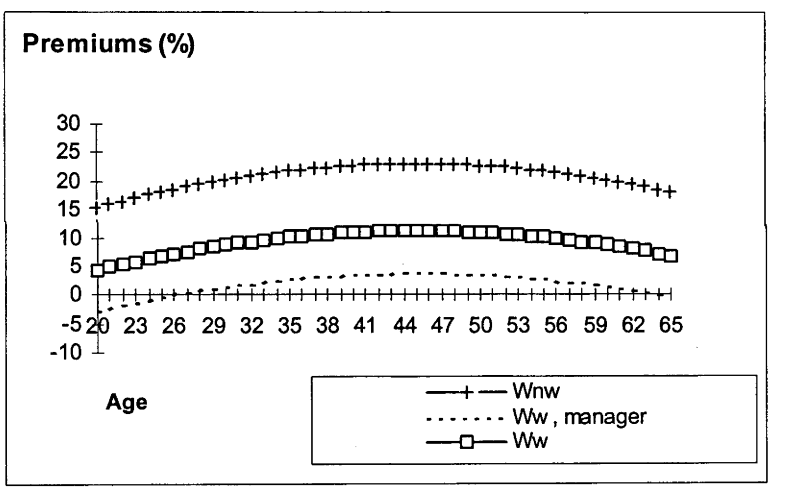
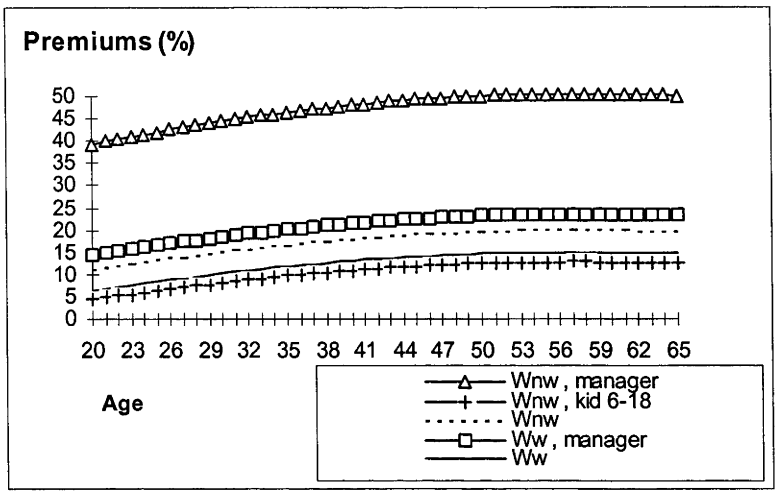


Figure 4.8: Marriage premiums over the working life: USA 1994



4.5 Conclusion

This chapter presented empirical evidence that confirmed the existence of the male marriage premium in Australian, Canadian and US cross-section data sets ranging from the early 1980s to the mid 1990s. In log hourly wage equations, estimated by OLS, currently married men earned more than unmarried men did after controlling for age, education, ethnicity and location. Empirical analysis reported here suggested that, in general, married men who worked part-time in the reference week or full-time in the reference week, but for only part of the year, earned a significantly smaller premium than did married men working full-time full-year. This finding is inconsistent with the selection into marriage and discrimination explanations for the marriage premium.

The bulk of the analysis discussed in this chapter relates to men working full-time full-year. However the samples used for Australia 1981 and 1994 include all men who worked full-time in the reference week.

Between country comparison was made with the Australia 1989, Canada 1991 and US 1979 data sets. These three data sets allowed the most consistent comparison. In section 4.3 I reported that the marriage premiums for men working full-time full-year in Australia, Canada and the USA were 8.5 per cent, 15.3 per cent and

17.1 per cent respectively. In specifications which replaced marital status dummies with separate age variables for married men and an indicator variable for men with working wives I found that, consistent with the specialisation hypothesis, human capital appeared to accrue over the course of the marriages. The age increment to wage for married men exceeded that of never married men in all countries. Furthermore, men with wives who worked in the paid labour market received lower premiums than did men with wives who did not work at all.

However, when an indicator variable for managers with working wives was added to the set of explanatory variables, the US working wife penalty was restricted to men who worked as managers. In contrast, Canadian men suffered the same working wife penalty regardless of whether they worked as managers. The results for Australian men were inconclusive. The estimated coefficient on the indicator variable for men with working wives became insignificant at the ten per cent level, but the estimated coefficient for managers with working wives was also insignificant.

US married men received the same size premium regardless of the presence of dependent children. In contrast all Canadian married men with children and Australian married men with children aged six or more received a higher premium. Couples with children might be more motivated to specialise, depending on the ease with which couples can combine paid work with child-care and the couples' preferences regarding the time and effort they spend in their own child-care pursuits.

Section 4.4 reported on over-time changes in the marriage premium and its components. These comparisons were somewhat thwarted by data comparison limitations. My estimations suggest that the size of the Canadian and Australian premiums fell over the 1980s by 6 percentage points and 8.4 percentage points respectively. However the estimated US premium was much the same size in the 1979 and 1994 data sets. This finding conflicts with Blackburn and Korenman (1994) and Gray (1997) who concluded that the size of the US premium fell over a similar period. I put my incongruous findings down to the data limitations,

although the studies that claim to find a fall in the size of the US premium over time are not clear about their own data limitations.

In terms of the specialisation hypothesis, consideration of the component premiums led me to conclude that that Canadian and Australian married men were in general less specialised in the mid-1990s than they were in the early 1980s and/or received a lower return to specialisation related human capital. In all countries married men without working wives took less advantage of the opportunity to specialise in the 1990s. In the US this could have been counterbalanced to some extent by the increased return to specialisation related human capital.

But this analysis is based on OLS estimation of cross-section data. Such a methodology ignores the potential problems of endogeneity. This problem is tackled in Chapters Five and Six, which consider the specialisation hypothesis in more detail, focussing on the relationship between the wages of married men and the labour force attachment of their wives. Chapter Five also attempts to isolate the effects of the amount of specialisation from the return to that specialisation.

It was disappointing that, because of data limitations, I was unable to empirically observe over-time changes in the effect of children on men's earnings. However, the analysis presented in Chapter Six analyses separately couples with dependent children and couples without.

Appendix 4A: Variable Definitions

	Australia		Canada		USA	
	1981	1994	1981	1994	1979	1994
Hourly Wage	Current weekly earnings from wages and salaries / current weekly hours		Current weekly earnings from wages and salaries / current weekly hours	Annual earnings from wages and salaries / annual hours	Current weekly earnings from wages and salaries / current weekly hours	Annual earnings from wages and salaries / annual hours
Binary variables = 1 if:						
Wife working	Worked in reference week		Worked in reference week		Worked in reference week	
Education						
Tertiary	Bachelors degree at least.	Bachelors degree at least	Bachelors degree at least		15 + years of schooling	Bachelors degree at least
Certificate/ Diploma	Certificate, diploma	Diploma	Trade certificate, diploma		N/A	Associate degree
Post-Secondary	Trade certificate	Vocational qualification	Some post-secondary		13-14 years of schooling	Some college
Secondary	Higher school certificate	N/A	11-13 years of schooling		12 years of schooling	High school diploma
Location						
NSW	New South Wales					
Vic	Victoria					
Qld	Queensland					
WA	West Australia					
SA	South Australia					
Tas	Tasmania					
Urban			Large urban area	Urban area of 100 000+ population	Central city/ metropolitan	City of 2.5 million + population
Ethnicity	N/A		N/A		Black Americans	
Kid <6	Dependent children aged less than 6		Dependent children aged less than 6		Dependent children aged less than 6	
Kid 6+	Dependent children aged 6 or more		Dependent children aged 6 or more		Dependent children aged 6 or more	

	Australia 1989	**Canada 1991**	**USA 1991**
Hourly wage	Annual earnings from wages and salaries / annual hours	Annual earnings from wages and salaries / annual hours	Annual earnings from wages and salaries / annual hours
Education			
Tertiary	Bachelors degree at least	Bachelors degree at least	Bachelors degree at least
Certificate/Diploma	Certificate/ diploma	Trade certificate, diploma	Associate degree
Post-secondary	Trade certificate	Some post-secondary	Some college
Secondary	Higher School Certificate	11-13 years of Schooling	High school diploma
Location	Capital city	City of 100 000+	City of 2.5 + million
Ethnicity	Migrant, not from UK	Spoken language is not French or English	Blacks
Part-time	Worked part-time in reference week	Worked part-time in reference week	Worked part-time in reference week
Full-time part-year	Worked full-time in reference week, but not for entire year	Working full-time in reference week, but not for entire year	Working full-time in reference week, but not for entire year
Wife working	Worked in reference week	Worked in reference week	Worked in reference week
Kid <6	Dependent children aged less than 6	Dependent children aged less than 6	Dependent children aged less than 6
Kid 6+	Dependent children aged 6-16	Dependent children aged 6-16	Dependent children aged 6-16

Appendix 4B: Characteristics of currently married and never married employed men – Australia 1989, Canada 1991, USA 1991

i) All who worked in reference week

	Australia 1989 Proportion of sample (%)	**Canada 1991** Proportion of sample (%)	**USA 1991** Proportion of sample (%)
Married	86.4	88.1	85.5
Working part-time	3.0	4.5	3.5
Working full-time part year	4.8	8.4	15.0
Age	38.8	39.7	39.2
	(10.6)	(10.3)	(10.9)
Ethnicity	17.8	14.9	7.2
Location	69.5	41.4	31.8
Education			
Tertiary	16.2	16.1	26.1
Certificate/Diploma	15.9	31.7	7.4
Post-secondary	27.2	7.3	18.6
Secondary	11.5	26.8	34.4
Working part-time	4.0	5.8	5.5
Working full-time part year	7.0	10.2	18.4
Log wage	2.59	2.71	2.47
	(0.44)	(0.61)	(0.68)
Number of observations	5294	7480	6118

ii) Those working full-time in reference week and full-time for at least 48 weeks of preceding year

	Australia 1989 Proportion of sample (%)	**Canada 1991** Proportion of sample (%)	**USA 1991** Proportion of sample (%)
Married	88.3	89.7	88.0
Age	35.4	36.8	35.8
	(16.0)	(15.5)	(16.4)
Wife working	55.3	61.1	65.6
Manager	11.1	17.5	10.2
Wife working and manager	7.2	12.4	7.4
Kid <6	26.6	24.5	26.3
Kid 6+	28.7	30.7	27.2
Black			5.6
Age	39.0	40.2	39.8
	(10.4)	(9.9)	(10.5)
Ethnicity	17.3	14.8	7.0
Location	69.7	42.2	32.8
Education			
Tertiary	16.2	17.1	28.6
Certificate/Diploma	16.3	31.9	8.0
Post-secondary	20.0	7.1	18.2
118	11.4	27.0	34.2
Secondary			
Manager	11.9	19.1	11.2
Kid <6	26.6	24.6	26.5
Kid 6+	28.8	30.7	27.4
Log wage	2.62	2.78	2.56
	(0.39)	(0.54)	(0.56)
Number of observations	4712	6284	4656

Appendix 4.C: The coefficients from OLS estimation of the hourly wages of currently married and never married men with t-statistics in brackets – Australia 1989, Canada 1991, USA 1991

Australia 1989	Men working	Men working full-time full-year		
		Spec. 1	Spec. 2	Spec. 3
Constant	1.466	1.570	1.627	1.739
	(19.072)	(21.307)	(21.725)	(21.890)
Married	0.073	0.082		
	(3.815)	(4.758)		
Working part-time in reference week	-0.212			
	(-3.237)			
Working full-time in reference week, but not for entire year	0.116			
	(2.381)			
Age			3.256E-03	2.580E-03
			(5.908)	(4.122)
Wife working			-0.022	-0.019
			(-1.953)	(-1.485)
Kid <6				0.001
				(0.067)
Kid 6+				0.028
				(1.902)
Manager				0.116
				(1.732)
Manager and wife working				-0.053
				(-1.554)
Age	0.044	0.039	0.037	0.032
	(11.112)	(10.141)	(9.647)	(7.522)
Age squared	-4.789E-04	-4.197	-4.401E-04	-3.719E-04
	(-10.047)	(-9.140)	(-9.649)	(-7.285)
Migrant	-0.071	-0.082	-0.083	-0.070
	(-4.789)	(-5.866)	(-5.943)	(-5.031)
Education				
Tertiary	0.360	0.369	0.371	0.353
	(20.655)	(22.306)	(22.428)	(21.500)
Certificate/Diploma	0.203	0.199	0.200	0.190
	(11.729)	(12.285)	(12.350)	(11.854)
Trade	0.106	0.108	0.108	0.116
	(7.122)	(7.774)	(7.771)	(8.422)
Secondary	0.116	0.110	0.111	0.098
	(5.909)	(5.906)	(5.996)	(5.354)
Capital	0.041	0.040	0.041	0.032
	(3.332)	(3.447)	(3.534)	(2.775)
Working part-time in reference week	-0.024			
	(-0.414)			
Working full-time in reference week, but not for entire year	-0.243			
	(-5.888)			
Manager				0.106
				(1.738)
Adjusted R squared	0.1510	0.1495	0.1516	0.1744
N° of observations	5294	4712	4712	4712

Canada 1991	Men working	Men working full-time full-year		
		Spec. 1	Spec. 2	Spec. 3
Constant	1.233	1.264	1.327	1.415
	(12.680)	(12.477)	(12.934)	(12.900)
Married	**0.137**	**0.142**		
	(5.688)	**(6.336)**		
Working part-time	0.027			
	(0.404)			
Working full-time in reference week, but not for entire year	-0.118			
	(-2.052)			
Age			5.594E-03	4.158E-03
			(8.100)	(5.241)
Age squared				
Wife working			-0.077	-0.070
			(-5.223)	(-4.308)
Kid <6				0.032
				(1.692)
Kid 6 +				0.037
				(2.115)
Manager				0.174
				(2.742)
Manager and wife working				-0.034
				(-0.901)
Age	0.054	0.051	0.052	0.047
	(11.111)	(10.032)	(9.996)	(8.427)
Age squared	-5.573E-04	-5.197E-04	-5.886E-04	-5.168E-04
	(-9.614)	(-8.582)	(-9.745)	(-7.733)
Migrant	-0.070	-0.087	-0.091	-0.090
	(-3.756)	(-4.628)	(-4.847)	(-4.779)
Education				
Tertiary	0.406	0.436	0.444	0.422
	(17.879)	(19.146)	(19.513)	(18.156)
Certificate/Diploma	0.216	0.225	0.231	0.220
	(11.143)	(11.336)	(11.650)	(11.009)
Post-secondary	0.134	0.169	0.177	0.163
	(4.644)	(5.761)	(6.025)	(5.534)
Secondary	0.132	0.141	0.147	0.137
	(6.571)	(6.846)	(7.173)	(6.654)
Urban	0.068	0.080	0.083	0.081
	(4.990)	(5.885)	(6.086)	(5.988)
Working part-time	-0.644			
	(-10.819)			
Working full-time in reference week, but not for entire year	-0.013			
	(-0.252)			
Manager				-0.066
				(-1.186)
Adjusted R squared	0.1622	0.1093	0.1134	0.1170
N° of observations	7480	6284	6284	6284

USA 1991	Men working	Men working full-time full-year		
		Spec. 1	Spec. 2	Spec. 3
Constant	0.455	0.298	0.323	0.291
	(4.504)	(2.926)	(3.058)	(2.655)
Married	**0.162**	**0.158**		
	(6.045)	**(6.890)**		
Working part-time	-0.159			
	(-2.277)			
Working full-time in reference week, but not for entire year	0.007			
	(0.131)			
Age			-3.985E-03	-6.731E-03
			(-1.540)	(-2.394)
Age squared			2.66E-04	3.001E-04
			(4.330)	(4.732)
Wife working			-0.055	-0.027
			(-3.149)	(-1.442)
Kid < 6				0.019
				(0.913)
Kid 6+				-0.006
				(-0.297)
Manager				0.212
				(2.427)
Manager and wife working				-0.180
				(-3.424)
Black				0.093
				(1.328)
Age	0.066	0.074	0.085	0.088
	(12.976)	(14.224)	(13.660)	(13.572)
Age squared	-6.463E-04	-7.371E-04	-1.077	-1.110E-03
	(-10.647)	(-11.954)	(-11.618)	(-11.670)
Black	-0.170	-0.154	-0.148	-0.219
	(-5.953)	(-5.532)	(-5.325)	(-3.443)
Education				
Tertiary	0.640	0.652	0.651	0.614
	(25.361)	(25.601)	(25.675)	(23.963)
Certificate/Diploma	0.445	0.462	0.462	0.448
	(13.096)	(13.942)	(13.996)	(13.653)
Post-secondary	0.379	0.413	0.414	0.399
	(14.270)	(15.194)	(15.286)	(14.735)
Secondary	0.303	0.305	0.305	0.299
	(12.708)	(12.384)	(12.435)	(12.214)
Urban	0.170	0.162	0.159	0.155
	(10.618)	(10.651)	(10.500)	(10.248)
Working part-time	-0.694			
	(-12.152)			
Working full-time in reference week, but not for entire year	-0.035			
	(-0.746)			
Manager				0.092
				(1.256)
Adjusted R squared	0.2893	0.2627	0.2711	0.2807
N° of observations	6118	4656	4656	4656

Appendix 4.D: Characteristics of currently married and unmarried employed men – Australia (1981, 1994), Canada (1982, 1994), USA (1979, 1991)

	Australia Proportion of sample (%)		**Canada** Proportion of sample (%)		**USA** Proportion of sample (%)	
	1994	1981	1994	1981	1994	1979
Married	78.8	82.8	84.8	85.8	74.6	82.8
Wife working	48.9	40.0	59.5	54.1	56.6	53.2
Wife working and manager	N/A	N/A	12.1	7.4	6.6	9.9
Kid < 6	23.0	25.2	23.5	29.8	23.1	22.5
Kid 6+	24.4	30.1	28.4	27.0	23.9	31.4
Manager	N/A	N/A	16.5	11.7	9.2	15.2
Black American	N/A	N/A	N/A	N/A	4.8	4.9
Age	32.5	33.1	34.8	34.7	30.8	33.6
	(18.9)	(18.1)	(17.1)	(17.6)	(19.9)	(18.5)
Age	39.8	38.9	41.6	39.6	40.1	39.7
	(10.1)	(11.4)	(9.6)	(11.5)	(10.3)	(11.5)
Ethnicity	N/A	N/A	N/A	N/A	7.4	6.7
Location			58.3	42.6	34.9	22.0
NSW		24.4				
Vic	21.1	20.8				
Qld	18.2	16.8				
WA	10.5	14.6				
SA	14.3	13.0				
Tas	6.8	6.7				
Education						
Tertiary	18.3	10.9	20.0	14.1	30.6	41.4
Certificate/ Diploma	10.9	15.3	33.7	11.7	8.3	N/A
Post-secondary	28.9	28.8	7.2	8.7	18.5	40.8
Secondary	N/A	11.6	25.7	22.0	31.1	3.8
Kids < 6	23.1	25.4	23.7	30.1	24.1	22.8
Kids 6+	25.1	30.8	29.5	27.9	25.5	32.5
Manager	N/A	N/A	19.1	13.2	11.5	17.6
Log wage	2.72	2.05	2.87	2.33	2.64	2.03
	(0.44)	(0.46)	(0.51)	(0.48)	(0.61)	(0.50)
Number of observations	2688	6726	11 062	5390	20 353	5420

Appendix 4.E.: The coefficients from OLS estimation of the hourly wages of currently married and never married men with t-statistics in brackets –Australia (1981, 1994), Canada (1981, 1994), USA (1979, 1994)

Australia 1981	Working full-time		
	Spec. 1	Spec. 2	Spec. 3
Constant	0.937	1.061	1.108
	(13.066)	(14.389)	(14.263)
Married	0.139		
	(9.631)		
Age		1.012E-02	1.092
		(7.129)	(6.651)
Age squared		-1.354E-04	-1.513E-04
		(-4.430)	(-4.550)
Wife working		-0.070	-0.076
		(-6.059)	(-6.279)
Kid <6			0.061
			(0.502)
Kid 6+			-0.002
			(-0.037)
Age	0.046	0.038	0.036
	(13.182)	(9.861)	(8.635)
Age squared	-4.985E-04	-4.02E-04	-3.697E-04
	(-11.964)	(-7.633)	(-8.678)
Education			
Tertiary	0.385	0.392	0.394
	(20.818)	(21.204)	(21.292)
Certificate/Diploma	0.238	0.240	0.241
	(14.676)	(14.820)	(14.866)
Trade	0.058	0.059	0.059
	(4.401)	(4.426)	(4.436)
Secondary	0.116	0.120	0.123
	(6.392)	(6.622)	(6.728)
NSW	-0.022	-0.026	-0.025
	(-0.741)	(-0.880)	(-0.858)
Vic	-0.080	-0.084	-0.084
	(-2.716)	(-2.846)	(-2.854)
Qld	-0.104	-0.110	-0.111
	(-3.453)	(-3.676)	(-3.698)
WA	-0.043	-0.048	-0.048
	(-1.411)	(-1.584)	(-1.577)
SA	-0.123	-0.126	-0.126
	(-4.004)	(-4.103)	(-4.103)
Tas	-0.046	-0.054	-0.054
	(-1.352)	(-1.598)	(-1.584)
Kid < 6			-0.081
			(-0.682)
Kid 6+			0.019
			(0.300)
Adjusted R squared	0.1397	0.1437	0.1440
N° of observations	6726	6726	6726

Australia 1994	Working full-time in reference week		
	Spec. 1	Spec. 2	Spec. 3
Constant	1.911	1.906	1.957
	(15.433)	(15.387)	(14.850)
Married	0.063	0.075	0.056
	(2.966)	(3.114)	(1.926)
Wife working		-0.020	-0.014
		(-1.065)	(-0.735)
Kid <6			0.031
			(1.244)
Kid 6+			-0.015
			(-0.150)
Age	0.036	0.036	0.033
	(5.667)	(5.714)	(4.853)
Age squared	-4.048E-04	-4.092E-04	-3.673E-04
	(-5.299)	(-5.348)	(-4.424)
Education			
Tertiary	0.340	0.341	0.340
	(15.013)	(15.035)	(14.936)
Certificate/Diploma	0.150	0.151	0.150
	(5.477)	(5.492)	(5.489)
Post-secondary	0.020	0.021	0.021
	(1.045)	(1.065)	(1.069)
NSW	-0.023	-0.025	-0.025
	(-0.672)	(-0.733)	(-0.729)
Vic	-0.064	-0.066	-0.067
	(-1.856)	(-1.916)	(-1.940)
Qld	-0.100	-0.102	-0.102
	(-2.854)	(-2.909)	(-2.905)
WA	-0.089	-0.091	-0.090
	(-2.306)	(-2.342)	(-2.316)
SA	-0.082	-0.084	-0.084
	(-2.245)	(-2.300)	(-2.289)
Tas	-0.080	-0.082	-0.081
	(-1.864)	(-1.915)	(-1.888)
Kid 6+			0.040
			(0.402)
Adjusted R squared	0.1170	0.1171	0.1167
N° of observations	2688	2688	2688

Canada 1981	Working full-time full year		
	Spec. 1	Spec. 2	Spec. 3
Constant	1.172	1.310	1.467
	(14.373)	(15.649)	(16.301)
Married	0.134		
	(7.360)		
Age		9.447E-03	1.023E-02
		(5.065)	(4.796)
Age squared		-9.37E-05	-1.11E-04
		(-2.355)	(-2.592)
Wife working		-0.108	-0.106
		(-7.735)	(-6.963)
Kid <6			-0.101
			(-0.850)
Kid 6+			-0.122
			(-1.727)
Manager			0.032
			(0.502)
manager and wife working			-0.031
			(-0.774)
Age	0.042	0.036	0.027
	(10.023)	(7.446)	(5.232)
Age squared	-4.493E-04	-3.987E-04	-2.993E-04
	(-9.065)	(-6.083)	(-4.310)
Education			
Tertiary	0.391	0.398	0.367
	(20.117)	(20.696)	(18.659)
Certificate/Diploma	0.181	0.183	0.168
	(8.792)	(8.957)	(8.175)
Post secondary	0.153	0.160	0.142
	(6.562)	(6.912)	(6.090)
Secondary	0.144	0.148	0.135
	(8.755)	(8.986)	(8.205)
Urban	0.077		
	(6.073)		
Manager			0.139
			(2.546)
Kid < 6			0.090
			(0.766)
Kid 6 +			0.159
			(2.299)
Adjusted R squared	0.1167	0.1265	0.1378
N° of observations	5390	5390	5390

Canada 1994	Working full-time full year		
	Spec. 1	Spec. 2	Spec. 3
Constant	0.866	0.937	1.007
	(11.653)	(12.480)	(12.671)
Married	0.080		
	(6.350)		
Age		6.116E-03	5.172E-03
			(3.119)
Age squared		(-8.14E-05	-6.78E-05
		(-2.485)	(-1.965)
Wife working		-0.037	-0.030
		(-3.470)	(-2.531)
Kid < 6			-0.153
			(-1.396)
Kid 6+			-0.036
			(-0.753)
Manager			0.040
			(1.036)
Manager and wife working			-0.037
			(-1.360)
Age	0.075	0.070	0.067
	(20.418)	(17.456)	(15.685)
Age squared	-7.603E-04	-7.037E-04	-6.645E-04
	(-17.515)	(-12.909)	(-11.695)
Education			
Tertiary	0.412	0.415	0.389
	(25.464)	(25.623)	(23.470)
Certificate/Diploma	0.221	0.223	0.211
	(14.937)	(15.056)	(14.232)
Post secondary	0.179	0.183	0.166
	(8.499)	(8.656)	(7.808)
Secondary	0.120	0.122	0.112
	(7.762)	(7.893)	(7.234)
Urban	0.058	0.059	0.058
	(6.270)	(6.442)	(6.328)
Manager			0.074
			(2.437)
Kid <6			0.168
			(1.548)
Kid 6+			0.062
			(1.361)
Adjusted R squared	0.1434	0.1443	0.1486
N° of observations	11 062	11 062	11 062

USA 1979	Working full-time full-year		
	Spec. 1	Spec. 2	Spec. 3
Constant	0.363	0.510	0.610
	(4.394)	(6.082)	(6.729)
Married	0.123		
	(7.293)		
Age		9.860E-03	9.237E-03
		(5.516)	(4.399)
Age squared		-1.106E-04	-1.025E-04
		(-2.883)	(-2.445)
Wife working		-0.112	-0.102
		(-7.886)	(-6.407)
Kid <6			0.073
			(0.632)
Kid 6+			-0.098
			(-1.557)
Manager			0.052
			(0.997)
Manager and wife working			-0.069
			(-1.888)
Black			-0.014
			(-0.253)
Age	0.056	0.049	0.044
	(13.584)	(10.499)	(8.703)
Age squared	-5.583E-04	-4.839E-04	-4.293E-04
	(-11.297)	(-7.588)	(-6.348)
Black	-0.158	-0.149	-0.133
	(-6.236)	(-5.904)	(-2.750)
Education			
Tertiary	0.461	0.465	0.445
	(23.449)	(23.754)	(22.416)
Post-secondary	0.292	0.298	0.286
	(14.938)	(15.309)	(14.697)
Secondary	0.117	0.113	0.109
	(3.245)	(3.165)	(3.070)
Urban	-0.034	-0.034	-0.031
	(-2.247)	(-2.242)	(-2.038)
Manager			0.091
			(2.123)
Kid <6			-0.073
			(-0.641)
Kid 6+			0.132
			(2.153)
Adjusted R squared	0.1781	0.1874	0.1933
N° of observations	5420	5420	5420

USA 1994	Working full-time full-year		
	Spec. 1	Spec. 2	Spec. 3
Constant	0.350	0.430	0.434
	(6.511)	(7.779)	(7.609)
Married	0.132		
	(15.343)		
Age		7.695E-03	6.369E-03
		(7.486)	(5.305)
Age squared		-6.97E-05	-5.57E-05
		(-3.218)	(-2.353)
Wife working		-0.071	-0.044
		(-7.135)	(-4.156)
Kid <6			-0.013
			(-0.349)
Kid 6+			-0.063
			(-1.999)
Manager			0.226
			(6.500)
Wife working and manager			-0.154
			(-5.380)
Black			0.002
			(0.061)
Age	0.075	0.071	0.071
	(27.700)	(23.907)	(23.907)
Age squared	-7.321E-04	-7.129E-04	-7.194E-04
	(-22.826)	(-18.090)	(-17.771)
Black	-0.152	-0.149	-0.143
	(-10.881)	(-10.699)	(-6.059)
Education			
Tertiary	0.705	0.711	0.675
	(54.067)	(54.414)	(51.123)
Certificate/Diploma	0.473	0.481	0.464
	(27.877)	(28.307)	(27.427)
Post-secondary	0.386	0.393	0.377
	(27.416)	(27.889)	(26.837)
Secondary	0.292	0.298	0.288
	(22.563)	(23.016)	(23.330)
Urban	0.135	0.132	0.128
	(17.524)	(17.103)	(16.712)
Manager			0.095
			(3.848)
Kid <6			0.015
			(0.414)
Kid 6+			0.056
			(1.872)
Adjusted R squared	0.2668	0.2688	0.2793
N° of observations	20 353	20 353	20 353

CHAPTER FIVE

DECOMPOSING THE DYNAMICS OF CROSS-COUNTRY DIFFERENCES IN THE SIZE OF THE MALE MARRIAGE PREMIUM

5.1 Introduction

The empirical analysis discussed in this chapter further examines the appropriateness of specialisation as an explanation of the male marriage premium by decomposing the dynamics of cross-country and over-time differences in the size of the male marriage premium. The decomposition technique allows me to differentiate the holdings of specialisation related human capital from the return to that human capital. This chapter uses test of consistency as I use cross-section data from Australia (1990 and 1994), Canada (1991 and 1994) and the USA (1991 and 1994). Specialisation is proxied by the wife's degree of attachment to the paid labour market.

Schoeni (1990) estimated that the US male marriage premium was significantly larger than both the Canadian and Australian premiums. Analysis presented in Chapter Four supports his findings. Subsequently Blackburn and Korenman (1994) and Gray (1997) established that the size of the US premium has been decreasing since the late 1960s. In this chapter I determine the cross-country differences in the sizes of the marriage premium around 1990 and in 1994, rather than differences between the early 1980s and 1994, for two main reasons. The two most recent waves of data are more comparable. Furthermore cross-section analysis cannot control for changes in the selection into marriage process. Gray (1997) claims to have found that the selection process changed dramatically between the late 1970s and the early 1990s.

Firstly I estimated disaggregated marriage premiums for each country and year, depending on the employment status of the wife (not working, working part-time, working full-time) to see whether the marriage premium varied with the perceived degree of specialisation. A finding that the premiums varied statistically in size

and that the size of the premiums increased with the degree of specialisation supports the specialisation hypothesis. In so doing I acknowledged the possibilities that the wife's employment status might be correlated with characteristics of her husband, unrelated to specialisation, that were negatively correlated with his wage and that as the husband's wage increased his wife might spend less time working in the paid labour market. Estimation using the instrumental variables technique enabled me to disentangle these influences from the effect of specialisation on men's earnings.

Secondly, for each country and time period, I decomposed the variation in average wages amongst married men using never married men as the point of comparison. Married were grouped according to the degree of specialisation - wife working full-time; wife working part-time; and wife not working. Based on the Juhn *et al.* (1991; 1993) decomposition technique, I used the estimated coefficients from a human capital wage equation for never married males to construct a set of errors in estimation for each group of married men. If specialisation was the key to differences in the wage outcomes between married and unmarried males, the extent of specialisation should be captured in those error terms. The decomposition technique allowed me to apportion differences in the groups' errors to differences in the groups' holdings of unobserved (or specialisation related) human capital and differences in the return to specialisation[1]. Using this technique cross country comparison of the errors for, married men with wives working full-time, for example, shows us how much of the cross-country difference is attributable to specialisation and how much to the return to that specialisation. This technique allowed me to compare movements over time in the cross-national gaps in the size of the disaggregated premiums with movements in the relative holdings of, and return to, specialisation related human capital.

The next section (section 5.2) explains the methodological approach. In section 5.3 I detail the data used in my analysis and describe the variables used. Section 5.4 outlines the empirical findings regarding cross-country and over time variations in the sizes of the male marriage premium (between currently married

[1] In contrast Gray (1997) assumed that the extent of specialisation at any hour of wives' labour supply remained constant over time. He measured the change in the return to specialisation over time by the change in the return to wives' labour supply.

and never-married males). It then reports estimates of the disaggregated male marriage premiums (wife not working, wife working part-time and wife working full-time). It also presents the results of Juhn *et al.* decompositions of the wage gaps between unmarried men and married men (grouped by the exogenous labour supply of the wives) and discusses their implications for specialisation. Conclusions are offered in section 5.5. It is suggested that specialisation can satisfactorily explain the dynamics of the US marriage premiums and partly explain the Australian-US dynamics. However it has little to say about the Canadian-US dynamics.

5.2 Empirical Methodology

A number of studies have documented the falling size of the US male marriage premium between the late 1970s and early 1990s (Blackburn and Korenman, 1994; Gray, 1997; Loh 1996). But, as I discussed in Chapter Two, there has been no agreement amongst these researchers as to the cause of the fall. Blackburn and Korenman (1994) claimed that neither specialisation nor selection played significant roles in the fall. As Gray (1997) argued, it is easy to be critical of their analysis because they did not attempt to correct for potential changes over time in the patterns of correlation between unobservable characteristics related to men's wages and the propensity to marry, years married and the degree of specialisation. However the results of analyses of longitudinal data, which claim to be better placed to control for the unobservable characteristics, have not been in agreement. Gray (1997) claims to have found that declining specialisation caused the falling premium[2]. In fact he argued that, while there was evidence that specialisation related human capital was a part of the wages of married men in the late 1970s, it was not in the early 1990s. Both Blackburn and Korenman (1994) and Gray

[2] Gray (1997) concluded that between the late 1970s and early 1990s years married became positively correlated with unobserved characteristics affecting men's wages. In the space of a little over a decade years of marriage switched from being a proxy for men's specialisation related human capital to men's fixed unobserved wage earning ability. He did not offer any explanation as to why this remarkable change occurred. In fact he also claimed that the returns to specialisation increased over the same period.

(1997) argued that that the return to specialisation increased, at least over the 1970s, because they found that the return to each year of marriage increased[3].

My cross-section analysis, that accounts for endogeneity of the wives' labour supply, is able to estimate the effect of wives' hours on husbands' wages excluding the following influence - the direct effect of husbands' wages on wives' hours and any correlation between unobserved factors and wives' hours and husbands' wages[4]. However, as Gray (1997) argues, IV estimation of cross-section data at different points in time will be contaminated by any changes in the process of selection into marriage. In my analysis I do not think it is a problem, since I compare cross-section data with four to five years difference. Gray (1997) compared longitudinal data from the late 1970s with the early 1990s.

The wives' labour supply may be endogenous in the husbands' wage equation. If it is endogenous the OLS estimates of the effect of the wives' degree of attachment to the paid labour market on husband's earnings are biased and inconsistent. For example, as the husbands' wages increase there is less financial incentive, from a household perspective, for the wives to work. If the wives respond to this financial incentive, unexplained movements in the husband's wage feed through to the wife's labour supply. The OLS procedure assigns in error, some of the disturbance-generated variation in the dependent variable to the wives' employment status. In this instance any observed negative relationship between the wives' employment status and the husband's wage would be overstated. There may also be something unobserved that is related to both the husbands' wage and the wives' employment status, for example unobserved. It is possible that people couple on the basis of unobserved ability or desire for a career. Positive assortative mating would show up as a positive relationship between the unexplained portion of the husband's wage and the wife's labour

[3] Blackburn and Korenman (1994) appeared keen to find an increase in the return to specialisation related human capital, since the returns to other forms of human capital investments increased over the same period (Juhn, *et al.*, 1993; Card and Lemieux 1996). This could also reflect increased specialisation per year of marriage or changes in the marriage partner selection process.

[4]Gray (1997) claims that instrumenting wives' hours will also wash out the effect of any measurement (of specialisation) error so that the effect of wives' hours on husbands' wage reflects the return to specialisation. I disagree. I think that the return to wives' hours reflects the amount of specialisation undertaken, and the extent to which the husband turns specialisation into specialisation related human capital, at a given labour supply and the return to specialisation related human capital.

supply, so the negative relationship between wife's employment status and the husband's wage would be understated. Equally men with more unobserved wage-earning ability might couple with women who prefer not to work in the paid labour market. These factors can be controlled for by estimation through the Instrumental Variables technique.

5.2.1 Estimating the male marriage premium

Male marriage premiums were estimated for each country in both time periods (Australia 1989 and 1994, Canada 1991 and 1994, the USA 1991 and 1994). The marriage premium is the percentage increment to wages accruing to married men, after controlling for observed human capital. In all the data sets de-facto couples are also recorded as married. Theoretically there is no reason for de-jure and non-dejure marriages to produce different marriage premiums.

I used the following wage equation as a basis for this analysis:

$$\mathbf{lnw_i} = \boldsymbol{a} + \boldsymbol{q}\mathbf{Married_i} + \boldsymbol{f}\mathbf{X_i} + \boldsymbol{u}_i \qquad \textbf{(5.1)}$$

where lnw_i is the log of the hourly wage of male i, Married is a zero/one dummy set to one for currently married men, X_i is a vector of measurable characteristics expected to affect wages such as age[5] and education, and u_i is the error term. The terms b, q and f are coefficients to be estimated. This equation is estimated by OLS.

[5] The data surveys do not contain measures of work experience. In this analysis I prefer not to use the conventional proxy of years of work experience - current age less years of education less age when began education. The data sets do not contain measures of years of education. Instead they contain measures of the highest level of educational attained. Since inter-country comparisons are an important part of the analysis I consider it more appropriate to use age as a proxy than to use potential experience, given the difficulties associated with allocating appropriate years of education to qualification in each country. However I have run regressions that allow the return to age to vary with education qualification. There was no significant change in the size and significance of the coefficients on the marital status dummies.

5.2.2 Disaggregating the male marriage premium by degree of specialisation

The first test of specialisation is to see whether the size of the disaggregated marriage premiums increase as the wives' attachment to the paid labour market decreases. The test of specialisation assumes that specialisation can be proxied by the wives' degree of attachment to the paid labour market. Equation 5.2 represents the equation to be estimated for each country in both time periods.

$$\mathbf{lnw_i} = b_1 + q_1\mathbf{wnw_i} + q_2\mathbf{wpt_i} + q_3\mathbf{wft_i} + b_2\mathbf{X_i} + u_i \qquad \textbf{(5.2)}$$

where wnw, wpt and wft are dummy variables, set to one for married men whose wives are: not working, working part-time and working full-time respectively. The *b*s and *q*s are coefficients to be estimated. The *q*s are used to calculate the disaggregated marriage premiums.

Equation 5.2 was estimated by OLS. It was also estimated by the instrumental variables (IV) technique because the wives' degree of attachment to the paid labour market may be endogenous.

So there is potentially another equation in the model, equation 5.3.

$$\mathbf{work_i} = c_1 + s_1\mathbf{lnw_i} + s_2\mathbf{lnw_{wi}} + c_2\,\mathbf{Z_i} + \varepsilon_i \qquad \textbf{(5.3)}$$

where work is an indicator variable showing whether the wife is working full-time, working part-time or not working, $\mathrm{lnw_{wi}}$ is the wives' wage, Z is the set of exogenous regressors and *c* and *s* are the coefficients to be estimated. Equation 5.3 is estimated in its reduced form with respect to the husbands' wages and the wives' wages. So a third equation for wives' wages is assumed, but not specified.

Once the reduced form of equation 5.3 has been estimated the instrument for work is constructed as the predicted value of the wives' labour supply given the estimated coefficients and values of the explanatory variables. The instrument is the component of wives' labour supply that is; unrelated to unobserved characteristics that are correlated with the husbands' wage, and not directly affected by the husbands' wage.

The reduced form of the wives' employment status is estimated by the multinomial logit technique. This assumes no intrinsic order among the response categories.

5.2.3 Decomposing changes over time in the sizes of the US disaggregated premiums and cross-country differences in the sizes of the disaggregated premiums

The next test is to consider whether cross-country differences in the premiums, and changes over time in those differences, are consistent with specialisation. Juhn, *et al.* (1991, 1993) developed an innovative decomposition method designed for comparing the wage gaps between two groups of people across countries. The traditional Blinder-Oaxaca (Blinder, 1973; Oaxaca, 1973) approach to decomposing wage differences focuses on the difference in predicted wages. It identifies that part of the wage gap attributable to differences in holdings of observed wage related characteristics and that part attributable to the difference in the estimated return to those characteristics. In contrast Juhn *et al.* also decomposed the residual (from estimation) differential based on percentile rankings, into differences in holdings of unmeasured, or unobserved, labour market skills and the return to those unobserved skills.

For each country this approach uses the estimated returns to human capital of the designated base group to assign a percentile rank to each member of the other group in the residual wage distribution of the non-designated group. Cross country differences in the residual gap between the two groups are separated into differences in the mean percentile ranks of the second (non-designated) group and differences in the dispersion of the base group's residual wage distribution. Analogous to the Blinder-Oaxaca approach the former is interpreted as the change in relative holdings of unmeasured labour market skills and the latter reflects the return to those skills.

This decomposition technique has resonance for an analysis of specialisation related human capital since such human capital is unobserved. In this analysis the

holdings of and return to unobserved labour market skills are interpreted as the holdings of specialisation related human capital and the return to that human capital. For each group of married men I calculate the portions of their wage advantage over never married men, attributable to their holdings of specialisation related human capital and the returns to that human capital. Cross-country differences in these portions are compared with cross-country differences in the size of the relevant marriage premiums in the two time periods, to see whether specialisation can explain the disaggregated marriage premium. By comparing the results of decomposition over time I also test whether specialisation can explain changes over time in cross-country differences in the size of the disaggregated marriage premiums.

To describe the Juhn *et al.*. decomposition I followed Blau and Kahn's (1992) notation and present a wage equation for a never married male in Australia;

$$\mathbf{lnw_{nmA} = b_{nmA} X_{nmA} + \theta_{nmA}\sigma_{nmA}} \qquad \mathbf{(5.4)}$$

where θ_{nmA} is the standardised residual from the log wage equation for never married Australian males; and σ_{nmA} is the standard deviation of the same residual.

The log wage gap between Australian never married males and males with wives who do not work is expressed as

$$\mathbf{lnw_{nmA} - lnw_{wnwA} = b_{nmA} (X_{nmA} - X_{wnwA}) + \sigma_{nmA}(\theta_{nmA} - \theta_{wnwA})} \qquad \mathbf{(5.5)}$$

The wage gap comprises differences in measured characteristics and differences in the standardized residual between never married males and males with wives who do not work. Note that the first term following the equals sign corresponds to the difference in return to coefficients term of the standard Blinder-Oaxaca decomposition, when the characteristics gap is valued with the never married male set of returns.

Equation 5.6 describes the difference in the Australian and the US wage gaps. The first row after the equals sign shows the contribution of the cross-country

differences in the between group gap in observed wage related characteristics. The second row measures the effect of cross-country differences in estimated returns to observed human capital. These terms are calculated from the mean characteristics of the men and the estimated coefficients on those characteristics from log wage equations.

$$(\ln w_{nmA} - \ln w_{wnwA}) - (\ln w_{nmU} - \ln w_{wnwU}) =$$

$$b_{nmU}\,[(X_{nmA} - X_{wnwA}) - (X_{nmU} - X_{wnwU})] +$$

$$(X_{nmA} - X_{wnwA})\,(b_{nmA} - b_{nmU}) \quad +$$

$$\sigma_{nmU}[(\theta_{nmA} - \theta_{wnwA}) - (\theta_{nmU} - \theta_{wnwU})] +$$

$$(\sigma_{nmA} - \sigma_{nmU})(\theta_{nmA} - \theta_{wnwA}) \qquad (5.6)$$

where θ_{wnwA} is the standardised residual for married males, with wives not working, using the estimated coefficients from the log wage regression for never married Australian males.

As Suen (1997) shows, the interpretation of the third and fourth terms depends crucially on the interpretation of the error in estimation. If unexplained differences in wage rates between married and unmarried males are due only to differences in unobservable skills then θ represents some unidimensional measure of labour market ability and σ represents the price of such ability. If, on the other hand, the wage rate gap is due to discrimination there is no difference in

unmeasured ability between the groups[6].

Under the specialisation theory θ is assumed to represent differential holdings of unobserved labour market ability related to the degree of specialisation and σ represents the return to specialisation related human capital. The size of the fourth term relative to the second term reflects the cross-country difference in the return to specialisation related human capital relative to the return to observed human capital, such as education and work experience.

The third term measures the effect of cross-country differences in residual wage positions of the males in each group (wnw and nm). In other words it considers whether the US wnw males rank higher in the US nm males residual distribution than do the Australian wnw males in the Australian nm males' distribution. This term picks up whether there are cross-country differences in the between group holdings of unobserved human capital.

To construct the third term I calculated two sets of residuals, for both Australia and the USA. One set comprised the residuals from the estimation of a log wage equation for nm males - the nm residuals. The other was made up of the residuals calculated by subtracting from the log wage of each wnw male, a constructed wage, which was the combination of his human capital characteristics and the estimated coefficients specific to never married males in his country - the wnw residuals. I calculate the mean of the wnw residuals for both countries - the mean wnw residual. I then determined, for Australia, the rank of the Australian mean wnw residual within the Australian nm residuals - the Australian wnw rank. Then

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[6] Juhn *et al.*'s decomposition assumes that θ and σ are independent. They will only be independent if there is no discrimination. If the wage gap is due to discrimination against never married males a rise in the price of skills will automatically be associated with an increase in the average rank of the never married males. Consider a never married male and a married male with the same wage. Assuming there is no discrimination both males should have the same overall level of skill. A rise in the price of the skill will cause wages to rise and the ranking of both males in the wage distribution will remain the same. However, the average wage gap between all married males and never married males will increase since on average never married males have less specialisation-related skills.
If, on the other hand there is discrimination a never married male and a married male with the same wage will have different levels of skill. The never married male will have more of the skill. When the price of the skill rises we would expect the wage of the never married male to increase by more than that of the married male. Hence the never married male will now have a higher rank. So the return to the skill is related directly to the ranking, which is used to measure the quantity of the skill.

I determined the value of the US nm residual corresponding to the Australian wnw rank - the US mean wnw residual for Australia. The third term is the difference between the US mean wnw residual and the US mean wnw residual for Australia.

The fourth term reflects cross-country differences in residual inequality as described in the residuals of nm males. It is obtained analogously to the third term and calculated as the difference between the US mean wnw residual for Australia and the Australian mean wnw residual.

The relevant terms for specialisation are the third and fourth terms. The third term represents cross-country differences in the amount of specialisation related human capital held by married men. The fourth term represents the effect of cross-country differences in the wage structures. In other words it shows the difference in how the countries value specialisation related unobserved human capital.

The size of the fourth terms relative to the second terms may also have implications for specialisation. The return to unobserved specialisation related human capital relative to the return to observed human capital could affect the motivations of a couple to specialise.

I base the formulation of the decomposition on the nm male wage equation, rather than on a pooled equation for all men. Blau and Kahn (1996a), in their analysis of gender pay gaps, use the male wage equation. Their rationale was that international differences in the coefficients from a male wage regression would be less affected by international differences in the extent of discrimination against women than would coefficients from a female or pooled male-female equation. Analogously we should not include married men in the base-line wage equation because our goal is to consider cross-country differences in the extent of marital specialisation and the effect that specialisation has on the husband's wage.

5.3 Data, Specification of Variables and Descriptive Statistics

The cross-sectional data sets used in the analysis are Australia 1989, 1994, Canada 1991, 1994, and the USA 1991, 1994. The samples used for estimation

include all currently married[7] and never married males aged 20 to 65 years. For the Canadian, US and Australia 1989 samples the men had worked at least 35 hours per week in the reference week and worked full-time for at least 48 weeks in the previous year. Self-employed men were excluded, as were men working in agriculture, men whose wives worked in agriculture and men with self-employed wives.

The Australia 1994 data set does not contain information on the number of weeks worked full-time in the last year so some of the men would not have worked full-time for the entire year. I use two samples of the Australia 1989 data set for estimation; one that matches the Canadian and US samples and one matching the Australia 1994 sample.

The dependent variable in the husbands' wage equation is the log of his hourly wage. In the samples of males working full-time full-year, it was calculated as annual earnings divided by the multiple of weeks worked full-time and the hours worked in the reference week. The dependent variable in the Australian samples where the males may not have worked full-time for the full year, was earnings in the reference week divided by the hours worked in the reference week.

Appendix 5.A outlines the characteristics used to describe the human capital attached to each man and *Appendix 5.B* lists the means of these characteristics. *Appendix 5.A* also lists the factors used to estimate the instrument of the wives' degree of attachment to the paid labour market. Their means are available on request from the author. The variable describing the wives' labour force attachment was set to: two if the wife worked 35 or more hours in the reference week (regardless of whether they reported any labour market earnings in the previous year); one if the wife worked less than 35 hours per week (regardless of earnings), and zero if the wife did not work in the reference week.

[7] Married men were part of a de-jure married couple or de-facto couple. Never married men are those, not in a de-facto relationship, who had never been part of a de-jure couple. Ideally they would not have been part of a de-facto relationship. However the data did not allow this distinction.

Married men did have higher wages, on average, than never married men. Married men tended to be older. On average they were in their early 40s compared with never married men who were in the early 30s.

The average wage of married men did not vary systematically with the labour force attachment of wives. In terms of age, men with wives working full-time tended to be younger than other married men were. In terms of education there were some patterns, suggestive of assortative mating. Canadian and Australian men with wives who worked full-time were most likely to be tertiary educated and men with wives who did not work the least likely. Tertiary educated women would be the most likely to work full-time. In the USA, however men with wives who worked part-time were most likely to be tertiary educated and there was little difference in the propensity to have tertiary education between men with wives who did not work and those with wives working full-time.

5.4 Empirical Results

5.4.1 Estimates of the male marriage premium

The results from OLS estimation of equation 5.1 for currently married and never married men are reported in *Appendix 5.C.* The estimated coefficients on the standard wage equation variables were consistent with those typically found in the literature. Wages increased with education and the age-wage relationships were concave. Residents of large cities earned significantly more on average, and members of minority groups earned less.

The primary concern was the impact that marriage had on male wages. Cross-country comparison of the estimated marriage premiums for males in both time periods, reported in *Table 5.1*, confirmed that marriage was related positively with male wages in Australia, Canada and the USA in the early 1990s[8]. Furthermore,

[8] The estimated marriage premiums for the 1994 samples differed in size from those reported in chapter four because the samples of men were different.

consistent with Schoeni's (1990) estimates for the 1980's, the US premium was the largest, followed by the Canadian and Australian premiums. Gray's (1997) estimated premium for US white men aged 24 to 31 in cross-section US data for 1989 to 1993 was 5.8 per cent. Loh (1996) found a US premium of 9.1 per cent for 1990. Whilst the Canadian and US premiums were smaller in size in the more recent time period, the size of the Australian premium appears to have increased over time. The observed reduction in the size of the US marriage premium was consistent with the prevailing US trend documented by Blackburn and Korenman (1994) and Gray (1997). For example Blackburn and Korenman found a ten percentage point drop in the male marriage premium between 1967 and 1988. However my estimates of the US marriage premium, presented in Chapter Four, suggested that it increased in size between 1979 and 1994.

Table 5.1: Male marriage premiums (percentage increment to hourly wage attributable to marriage) (c)

Australia 1989 (a)	Australia 1989 (b)	Canada 1991 (a)	USA 1991 (a)
8.2	9.2	14.3	15.7

	Australia 1994 (b)	Canada 1994 (a)	USA 1994 (a)
	9.6	9.6	14.2

(a) Males working full-time full-year with wage based on annual earnings.
(b) Males working full-time in reference week with wage based on reference week earnings. These samples may still not be strictly comparable since the 1991 survey excluded those who commenced their first job in the survey year and many of those who worked full-time part year.
(c) $(e^{\text{coefficient on marriage dummy}} - 1)$

It is possible that the cross-country differences in the sizes of the marriage premiums can be explained by differences in the average degree of specialisation within each country. In this analysis the degree of specialisation within a couple is proxied by the wife's degree of attachment to the paid labour market. *Table 5.2* reports married men grouped by their wife's degree of labour force attachment. About 75 percent of US wives worked in the labour market in both periods, compared with 70 percent of Canadian wives and 65 percent of Australian wives. In each country the majority worked full-time, but those working part-time accounted for about 20 per cent of jobs in the USA, close to 25 per cent in Canada and 30 per cent in Australia.

If, internationally couples had the same propensity and/or ability to specialise, given the wife's degree of attachment to the paid labour market, and the same return from specialisation prevailed in all countries then the US marriage premium should have been the smallest and the Australian premium the largest. Australian wives were the least likely to work and US wives the most likely. However the reverse was the case. The increased proportion of working wives over time in all countries is consistent with the decreased size of the marriage premiums.

Table 5.2: Married men grouped by the employment status of their wives (%) (c)

	Australia 1989 (a)	Australia 1989 (b)	Canada 1991 (a)	USA 1991 (a)
Wife is wage and salary earner (c)				
Full-time	33.8	33.5	44.1	54.6
Part-time	28.9	28.5	24.0	20.0
Wife not working in the labour market	37.3	38.0	31.9	25.5
N° of observations	4 161	4 449	5 634	4 098

	Australia 1994 (b)	Canada 1994 (a)	USA 1994 (a)
Wife is wage and salary earner (c)			
Full-time	34.1	46.8	56.3
Part-time	30.0	23.4	20.2
Wife not working in the labour market	35.9	29.8	23.4
N° of observations	2 047	9 243	15 977

(a) Males working full-time full-year with wage based on annual earnings.
(b) Males working full-time in reference week with wage based on reference week earnings.
(c) These categories are calculated on the reported hours worked. Wives who reported that they earned nothing for those hours are included in the analysis. Their exclusion does not change the results.

5.4.2 Estimates of disaggregated male marriage premiums

As a first step in determining the extent to which the specialisation hypothesis can explain the marriage premium this section considers the question of whether, within each country, the marriage premium varied with the degree of specialisation, as described by the wife's attachment to the paid labour market.

Ordinary least squares estimation

Equation 5.2 was firstly estimated by OLS. It included the same set of explanatory variables as equation 5.1, except that the currently married indicator variable was replaced with a set of three indicator variables for currently married males with; wives not working (wnw), wives working part-time (wpt) and wives working full-time (wft) respectively.

Estimates of the disaggregated marriage premiums are reported in *Table 5.3* (see *Appendix 5.D* for the underlying estimated regression results). In both time periods the estimated Canadian and US premiums followed the pattern suggested by the specialisation hypothesis, that is the more hours the wife worked in the labour market, the smaller is her husband's marriage premium. Similarly, the Australian premiums behaved consistently with the specialisation hypothesis for the 1989 sample of men who worked full-time full-year. For example, in 1991 the US husband of a woman who did not work received an hourly wage 22.5 percent higher than a similar never married male. The wage gap for men with wives who worked part time was 19.8 percent and the gap for men with wives who worked full-time was 11.7 percent. Gray (1997) found that the marriage premium in 1990 for US men whose wives did not work was nearly 17 per cent compared with nine per cent for men with wives who worked 40 hours per week.

In both time periods the disaggregated US marriage premiums were the largest in size while the Australians were the smallest. Over time the Canadian disaggregated premiums decreased in size. Only the wft premium fell substantially in size for Australia and the USA. The US wpt and wnw premiums remained much the same size, while the corresponding Australian premiums increased in size. However, the over time Australian comparisons are based on samples of men working full-time at the time of the survey, so men who worked full-time only part of the year were also included.

Table 5.3: Male marriage premiums disaggregated by wife's degree of attachment to the paid labour market (percentage increment to hourly wages) (c)

	Australia 1989 (a)	Australia 1989 (b)	Canada 1991 (a)	USA 1991 (a)
Wife working				
Full-time	6.3*	8.5*	11.0*	11.7*
Part-time	9.7*	9.5*	13.0*	19.8*
Wife not working in the labour market	10.1*	9.2*	19.5*	22.5*

	Australia 1994 (b)	Canada 1994 (a)	USA 1994 (a)
Wife working			
Full-time	6.6*	7.3*	9.7*
Part-time	11.4*	10.6*	19.5*
Wife not working in the labour market	11.4*	12.4*	21.9*

(a) Males working full-time full-year with wage based on annual earnings.
(b) Males working full-time in reference week with wage based on reference week earnings.
(c) $e^{(\text{coefficient on relevant dummy})} - 1$
* estimated coefficient significant at 5% level of significance.

These findings were consistent with the argument that US couples are more specialised, or that US husbands take the most opportunity to specialise, and/or receive more for their specialisation related human capital. Using this line of argument there may have been a reduction in the tendency for both US and Australian couples, in which the wife works full-time, to specialise. In Canada this tendency may have been across the board.

Hypotheses set out in Chapter Three considered changes between the early 1980s and mid 1990s that might have impinged on the tendency to specialise. Discrimination against women in the paid labour market is a motivation to specialise. Although I could not find analyses of pay discrimination over the early 1990s, the 1980s trend in Australia and the USA was for a reduction in discrimination. The Canadian trend was for no change. Since the trend is for women to take less breaks from the paid labour market to care for children it is likely that the wives' labour supply at a point in time is more representative of the couples' specialisation commitment. This might explain why the sizes of the US and Australian premiums for men whose wives worked full-time fell the most.

Equally, the explanation could be that the labour supply of US wives was more responsive to the husbands' wages, in both periods. Or, US couples might match in a more systematic fashion in terms of the husband's wage earning ability and

wife's desire for a career, selecting into marriage on the basis that wives who preferred not to work found husbands with the largest income earning potential.

Table 5.4 records F-statistics that indicate whether the sizes of the disaggregated marriage premiums were significantly different within each sample. In the first period samples of men working full year there was a significant difference, at the five per cent level, between the wft and wnw marriage premiums in all three countries. However the difference in size between the wft and wpt premiums was only significant in USA and Australia, while the size gap between the wpt and wnw premiums was only significant in Canada.

There was no significant difference in the size of the Australian premiums for the samples including men who worked full-time part year. Included in these samples are men who tend to have marginal attachment to the paid labour market, and gains from specialisation can only occur when working.

In the second period the wft premium was significantly smaller than the wpt and wnw premiums in Canada and the USA. However there was no significant difference between the wpt and wnw premiums in either country.

Table 5.4: F-statistics for difference between estimated coefficients

	Australia 1989 (a)	**Australia 1989** (b)	**Canada 1991** (a)	**USA 1991** (a)
Full-time – part-time	5.32*	1.22	1.10	12.23**
Full-time - not-working	5.57**	0.27	24.59**	24.83**
Part-time - not-working	0.01	0.41	10.98**	0.94

	Australia 1994 (b)	**Canada 1994** (a)	**USA 1994** (a)
Full-time – part-time	3.54	5.95**	62.81**
Full-time - not-working	3.83	16.76**	105.65**
Part-time - not-working	0.00	1.60	2.53

(a) Males working full-time full-year with wage based on annual earnings.
(b) Males working full-time in reference week with wage based on reference week earnings.
* difference significant at five per cent level
** difference significant at ten per cent level

It is possible that the ranges of hours used to construct the three indicator variables for wives' labour supply were inappropriate, in terms of their ability to describe the degree of specialisation. Chapter Six considers the relationship

between husband's wage and wives' continuous hours. Wives' hours enters as a quadratic, thus enabling a more flexible relationship between hours and specialisation.

Instrumental variables estimates

As discussed earlier, the degree of the wife's attachment to the paid labour market may be endogenous in terms of the husband's wage determination process. To control for possible simultaneity bias, I re-estimated equation 5.2 using the IV approach. Using the multinomial logit technique I estimated a reduced form equation explaining whether the wife worked full-time, worked part-time or did not work at all. The set of variables used as explanatory variables in this equation included the husband's education, the wife's education, location, ethnicity of both the husband and wife, the industry in which the husband worked, the wife's age, the number of dependent children, the age of the youngest dependent child and the log of household property income. Descriptive statistics for the variables used in this analysis are available from the author, as are the estimated parameters of the multinomial logit.

To construct the instrument I calculated, for each husband, the estimated probabilities that his wife did not work, worked part-time and worked full-time. I allocated the predicted employment status on the basis of which of the three values was highest.

I used Hausman's (1978) methodology to test for the exogeneity of the wives' labour supply. If, according to this methodology, the estimated coefficients for the predicted wives' labour supply (in the husband's structural equation) are significant, when the actual values for the wives' labour supply are also included as explanatory variables, wives' labour supply is endogenous. I included predicted part-time and full-time dummies. The test statistics for the Hausman test are reported in *Table 5.5*.

Table 5.5: Test statistics for exogeneity of wives' labour supply in husbands' wage equation

	Year	Test statistic
Australia	1989a	0.33
	1989b	4.89**
	1994	2.93
Canada	1991	4.63**
	1994	4.21*
USA	1991	4.24*
	1994	18.25**

* significant at the five per cent level
** significant at the one per cent level

The test statistics are distributed F with critical values of 3.0 at the five per cent level of significance and 4.6 at the one per cent level of significance. The wives' labour supply was endogenous in both US samples, at the five per cent level in 1991 and at the one per cent level in 1994. Similarly wives' labour supply was endogenous in both Canadian samples, at the one per cent level in 1991 and at the five per cent level in 1994. In the Australian samples wives' labour supply proved to be exogenous, at the one per cent level, in 1989 when the sample is restricted to men working full-time full-year. If however, the sample included men who may not have worked full-time for the full year preceding the survey exogeneity is rejected at the one per cent level of significance in 1989. However, exogeneity is at the five per cent level of significance in 1994.

The estimated premiums relating to the endogenised wives' labour supply are reported in *Table 5.6*. The estimated coefficients from the underlying men's wage equations appear in *Appendix 5.E*. The estimated coefficients from which the premiums are constructed were all significant at the five per cent level. But their relative sizes do not match the predictions of the specialisation theory. In general men with wives who do not work have the smallest premiums and men with wives who work part-time have the largest premiums. The sizes of the wnw dummy generally decreased, while the sizes of the wpt and wft dummies increased, the former by more than the latter. In contrast Gray (1997) found that the relationship between wives' continuous instrumented labour supply and the husbands' wage remained negative and the difference between the premiums of wnw and wft increased in size. Gray's instruments were the respondent's attitude toward gender roles in household production and the presence of an infant in the household. He instrumented specialisation, rather than the wives' labour supply.

Table 5.6: Male marriage premiums disaggregated by IV estimates of wives' degree of attachment to the paid labour market (percentage increment to hourly wages) (c)

	Australia 1989 (a)	Australia 1989 (b)	Canada 1991 (a)	USA 1991 (a)
Wife working				
Full-time	8.7*	9.3*	14.2*	15.8*
Part-time	9.6*	12.7*	-9.2*	33.8*
Wife not working in the labour market	7.4*	8.1*	15.0*	13.8*

	Australia 1994 (b)	Canada 1994 (a)	USA 1994 (a)
Wife working			
Full-time	9.3*	10.1*	14.8*
Part-time	14.7*	15.3*	29.7*
Wife not working in the labour market	8.5*	8.1*	9.4*

(a) Males working full-time full-year with wage based on annual earnings.
(b) Males working full-time in reference week with wage based on reference week earnings.
(c) $e^{(\text{coefficient on relevant dummy})} - 1$
* significant at 5% level of significance.

But IV estimates are not always robust. The instruments should satisfy two conditions. They should not be endogenous in the husbands' wage equation, but they should be highly correlated with the wives' labour supply. It is not possible to prove the first condition. I performed some sensitivity tests for the explanatory power of the instrument. I estimated the wives' reduced form labour supply model with the following subset of explanatory variables - those that also appeared in the husband's structural wage equation (husbands' ethnicity, education and age), those that would appear in the wives' wage equation (wives' age and education) and those that could be related to the husbands' wage (the husbands' ethnicity, location and the industry in which he worked). I regarded the remaining exogenous variables (wives' ethnicity, age of youngest dependent child and household property income) as the instruments. By comparing the explanatory power of the full model for wives' hours with the model estimated without these instruments the explanatory power of the instruments was determined. *Table 5.7* compares the log-likelihoods from the two models, and lists the chi-squared test statistics for the null hypothesis that the explanatory power of the instruments is zero. The critical value for the chi-squared is 23.69 at the five per cent level of significance and 29.14 at the one per cent level of significance.

Table 5.7: Log-likelihoods from multinomial logit estimates of the reduced form of wives' labour supply

Country	Year	Log-Likelihood from estimation of wives' hours without instruments	Log-Likelihood from estimation of wives' hours with instruments	Chi-squared (14) for explanatory power of instruments
Australia	1989a	-4304.72	-3830.15	756.26
	1989b	-4598.23	-4108.42	790.14
	1994	-2162.09	-1962.53	321.46
Canada	1991	-5735.58	-5541.81	385.36
	1994	-9373.97	-9069.24	561.71
USA	1991	-3933.82	-3739.31	345.67
	1994	-1523.38	-14609.56	1150.60

Another practical measure of the usefulness of the instruments is the proportion of correctly modelled events. They are reported in *Table 5.8*. The table records that the estimated model has difficulty predicting the employment status of the wives working part-time in the Canadian and US samples. The instruments did a reasonable job of predicting wives' labour supply in the Australian samples. There, wives' labour supply tended to be exogenous. These findings led me to use the wives' labour supply in its exogenous form for the remaining analysis of this chapter. In Chapter Six I estimated wives' hours as a continuous variable, hoping that the instruments would perform better.

Table 5.8: Percent of correctly modelled events

	Year	Not working	Working part-time	Working full-time
Australia	1989a	65.0	34.8	62.7
	1989b	66.7	33.6	61.9
	1994	63.5	32.5	62.2
Canada	1991	53.1	1.0	81.1
	1994	44.7	3.4	83.5
USA	1991	37.1	1.6	89.3
	1994	27.0	0.9	92.0

5.4.3 Results of the Juhn *et al.* decompositions

In this section I present the results of the Juhn *et al.* decompositions, the methodology of which was described in section 5.2. Recall that this decomposition technique should be able to unpack cross-country differences in the average wage gap between currently married men (grouped by the employment status of their wives) and never married men. The technique enabled me to identify cross-country differences in the extent of specialisation related

human capital and the return to that human capital, and compare these with cross-country differences in the size of the male marriage premium.

Table 5.9 compares the cross-country differences in log wage gaps with cross-country variations in the marriage premiums[9]. The men were grouped by the exogenous employment status of their wives. The size of the premium and related gap in log wages need not be identical. While the premiums represent differential holdings of unobserved human capital and returns to that capital, the wage gaps also included differences in holding of observed human capital and returns to that capital. The wage gaps tended to be larger than the relevant premiums, which is consistent with the observation that never married men tended to be more educated than currently married men were.

While the sizes of the Canadian and US premiums were smaller in 1994 than in 1991, the gap in the US wage gap was larger in 1994. Estimated coefficients, from log wage equations for never married men and married men grouped by the exogenous labour force status of their wives, are reported in *Appendix 5.F.* For never married US men, the sizes of the estimated coefficients on age and education were smaller in 1994 than in 1991. In contrast the estimated coefficients for married men were larger in size in 1994. In Canada and Australia, however, the same estimated coefficients increased in size over time for both never married and currently married men.

USA 1994 – USA 1991

This sub-section contains results from the decomposition of the over-time differences in the average wage gaps between US never-married and currently married males. Recall from the previous section that there was a reduction in the size of the US male marriage premium in the early 1990's, from 15.7 per cent to 14.2 per cent. When disaggregated, this reduction was more marked for men with

[9] The marriage premium represents the percentage contribution to the wage level, so the gap between two marriage premiums is the percentage point difference in contributions to the wage level. The difference between two log wages approximates the percentage difference between the tow underlying wage levels.

wives working full-time, although the premiums of the remaining married men also fell slightly (see *Table 5.3*).

Table 5.10 compares the premium difference with the second, third and fourth terms of equation 5.5 (*Appendix 5.G* reports the components of the third and fourth terms). These terms reflect percentage point movements in the wage gap difference between currently married and never married men, between USA 1994 and USA 1991. The second term represents that part of the 'over-time' difference in the wages gap attributable to differences (over time) in the return to observable human capital received by never married men. So, for example, the wage gap between wnw men and nm men increased by 10.8 percentage points between 1991 and 1994, due to the decrease over the same period in the return to observed human capital received by never married men. In contrast, the third term, representing over time differences in the gaps in unobserved human capital, contributed a 10.1 percentage point decrease in the wage gap. The fourth term shows that changes over time in the valuation of unobserved human capital contributed 3.3 percentage points to the reduction in the wage gap.

The third and fourth terms were both negative for each decomposition suggesting that holdings of unobserved human capital resultant on specialisation fell over the period, as did the return to those holdings. Specialisation appears to have played a role in causing the US marriage premium to fall between 1991 and 1994. Similarly, Gray (1997) claimed that US holdings of specialisation related human capital decreased markedly between the late 1970s and early 1990s. However, both Gray (1997) and Blackburn and Korenamn (1994) argued that the return to specialisation related human capital increased over the same period, in line with the general upwards trend in the return to human capital observed by numerous researchers including Card and Lemieux (1996) and Juhn *et al.* (1991).

Table 5.9: Comparison of marriage premiums with actual wage gaps, by wives' employment status (%) (c)

	Australia 1989 (a)		Australia 1989 (b)		Canada 1991 (a)		USA 1991 (a)	
	Premium	Difference in mean log wages	Premium	Difference in mean log wages	Premium	Difference in mean log wages	Premium	Difference in mean log wages
Between currently married and never married males								
wife not working – never married	10.6	11.2	9.2	8.2	19.5	22.6	22.5	28.5
Wife working part-time – never married	9.7	14.2	9.5	11.7	13.0	19.0	19.8	26.8
wife working full-time – never married	6.8	10.2	8.5	10.5	11.0	17.1	11.7	19.6

	Australia 1994 (b)		Canada 1994 (a)		USA 1994 (a)	
	Premium	Difference in mean log wages	Premium	Difference in mean log wages	Premium	Difference in mean log wages
Between currently married and never married males						
Wife not working – never married	11.4	14.4	12.4	19.3	21.9	32.0
wife working part-time – never married	11.4	16.5	10.6	19.4	19.5	33.9
wife working full-time – never married	6.6	11.2	7.3	16.2	9.7	22.8

(a) Males working full-time full-year with wage based on annual earnings.
(b) Males working full-time in reference week with wage based on reference week earnings.
(c) The premiums are reported in *Table 5.3*. The differences in wages are calculated from average log wage data.

The second term was positive, since the return to observed human capital increased over the 1990s. This may have encouraged men to focus on accruing observed human capital, rather than specialisation related human capital.

But there are still some unanswered questions. Why did the return to specialisation related human capital relative to other human capital fall over the early 1990s? And why did the premium of men with wives working full-time fall more than the other disaggregated premiums did? It is possible that the employer demands on women working full-time are increasing, making it more difficult for them to participate in specialisation. Furthermore, they might themselves feel less inclined to specialise as their wage-earning ability approaches men's. Another possibility is that wives working full-time are increasingly attached to their careers, so that their labour supply at a point in time more closely resembles their longer term specialisation commitment.

Australia 1989 – USA 1991 and Australia 1994 – USA 1994

Recall that in 1994 the US premium was 4.5 percentage points larger than the Australian premium. In the early 1990s the US premium was 6.5-7.5 percentage points larger. The Australian wft marriage premium fell by roughly the same extent as did the US wft premium. The Australian wnw and wpt premiums actually increased in size while the corresponding US premiums fell slightly.

Tables 5.11 and *5.12* compare the cross-country premium gaps with the second, third and fourth terms of equation 5.6 (*Appendix 5.H* outlines the components of the third and fourth terms). *Table 5.11* compares the comparisons for the first period and *Table 5.12* compares the comparisons for the second term.

The analysis suggests that in both periods the third and fourth terms contributed to the cross-country premium gaps. In other words, the US premiums were larger than the Australian premiums because US males held more specialisation related human capital and the US return to specialisation related unobserved human capital was larger than the Australian return. These observations are consistent with Australian couples having less motivation to take advantage of specialisation opportunities, because women are less discriminated against in the paid labour

market. Another possibility is that US couples were more skilled at taking advantage of specialisation opportunities.

Table 5.10: Juhn *et al.* decomposition of the difference in the log wage gaps between males grouped by the supposed intensity of specialisation: USA 1994-USA 1991 (Percentage point movement in wage)

	Percentage point difference in premium gap compared with USA 1991	Due to 2nd term – return to observed human capital	Due to 3rd term – amount of unobserved human capital	Due to 4th term – return to unobserved human capital	Sum 3rd and 4th terms
Wife not working – never married USA 1994	-0.6	10.8	-10.1	-3.3	-13.4
Wife working part-time – never married USA 1994	-0.3	6.3	-5.4	-3.0	-8.4
Wife working full-time – never married USA 1994	-1.9	5.9	-4.2	-5.6	-9.8

The gap in the return to unobserved human capital was much the same in 1994 as in the earlier period (fourth term). Analysis presented in the previous sub-section indicated that the US return to specialisation related human capital fell over the early 1990s. It appeared that Australia experienced much the same reduction.

There was a reduction in the cross-country gap in the amount of unobserved human capital held by married men, a movement that is consistent with the fall in the premium gap. Analysis of the falling US premium over the early 1990s suggested that the amount of unobservable human capital held by married American men fell between 1991 and 1994. This is consistent with decreases in the sizes of the US – Australia gaps in premiums over a similar period.

Both the US and Australian wft premiums fell by much the same extent over the period. While it seems that both countries experienced a reduction in the return to specialisation related human capital, the US advantage in the holdings of specialisation related human capital advantage decreased. So, the US wft premium should have fallen by more than the corresponding Australian premium.

Similarly I found inconsistencies with the wnw and wpt dynamics. Over the early 1990s the US advantage in the holdings of specialisation related human capital decreased. Consistent with this, over the same period the Australian wnw and wpt premiums increased in size while the size of the corresponding US premiums decreased. But, the increase in the size of the Australian premiums could have only come about if these increased their degree of specialisation, and/or the extent to which husbands took advantage of the specialisation, relatively more than the fall in the return to specialisation. Why would specialisation have increased over the early 1990s in Australia?

Table 5.11: Juhn *et al.* decomposition of the difference in the log wage gaps between males grouped by the supposed intensity of specialisation: Australia 1989/Canada 1991 - USA 1991

	Percentage point difference in premium gap compared with USA 1991	Due to 2nd term - return to observed human capital	Due to 3rd term – amount of unobserved human capital	Due to 4th term – return to unobserved human capital	Sum of 3rd and 4th terms
Wife not working - never married					
Australia (a)	-11.9	0.2	-15.2	-9.7	-24.9
Australia (b)	-13.3	-1.1	-17.7	-9.9	-27.6
Canada	-3.0	12.2	-18.1	-0.1	-18.2
Wife working part-time - never married					
Australia (a)	-10.1	-5.9	-6.8	-9.8	-16.6
Australia (b)	-10.3	-7.6	-4.9	-13.4	-18.3
Canada	-6.8	4.8	-15.3	-1.6	-16.9
Wife working full-time - never married					
Australia (a)	-4.9	-5.2	-5.4	-7.7	-13.1
Australia (b)	-3.2	-6.6	-2.1	-10.2	-12.3
Canada	-0.7	3.0	-11.0	0.1	-10.9

(a) Males working full-time full-year with wage based on annual earnings.
(b) Males working full-time in reference week with wage based on reference week earnings.

Canada 1991 – USA 1991 and Canada 1994 – USA 1994.

Over the early 1990's the positive gap between the US and Canadian premium increased in size, from 1.4 to 5.6 percentage points. Similarly the premium gaps

for men with wives of varying degrees of attachment to the paid labour market increased over time. All of the disaggregated Canadian premiums fell substantially between 1991 and 1994. Only the US wft premium fell significantly.

Table 5.12: Juhn *et al.* decomposition of the difference in the log wage gaps between males grouped by the supposed intensity of specialisation: Australia 1994/Canada 1994 - USA 1994

	Percentage point difference in premium gap compared with USA 1994	Due to 2nd term - return to observed human capital	Due to 3rd term – amount of unobserved human capital	Due to 4th term – return to unobserved human capital	Sum of 3rd and 4th terms
Wife not working - never married					
Australia	-10.5	-9.4	-6.0	-10.2	-16.2
Canada	-9.5	3.9	-14.9	0.0	-14.9
Wife working part-time - never married					
Australia	-8.1	-11.8	-4.1	-10.4	-14.1
Canada	-8.9	1.4	-14.4	1.0	-13.4
Wife working full-time - never married					
Australia	-3.1	-9.9	-1.4	-8.0	-9.4
Canada	-2.4	1.3	-7.0	1.5	-5.5

Results from the comparison of Canadian and US wages, reported in *Tables 5.11* and *5.12*, suggested that in both 1991 and 1994 the US premiums were larger than the Canadian premiums primarily because US married men had more unobserved human capital relative to never married men than Canadian married men did. The US return to that human capital was much the same as the Canadian return in both periods.

Between 1991 and 1994 the positive gap between the US and Canadian premiums increased. But the increased gap in the premiums appears to be inconsistent with movements in the relative amounts of unobserved human capital held by married men. The US advantage in the holdings of specialisation related human capital fell substantially.

Consideration of the cross-country gap between the returns to observed and unobserved human capital suggest that in both 1991 and 1994 US couples

received more financial inducement to take advantage of the opportunity to specialise than Canadian couples did. But, between 1991 and 1994 the size of the Canadian advantage in the return to observed human capital fell. This suggests that Canadian couples should have been more motivated to take advantage of specialisation opportunities, relative to US couples, in 1994. In fact the reverse appears to be true.

In conclusion, specialisation proves not to be a useful explanator of the dynamics in the differences between the US and Canadian premiums in the early 1990s.

5.5 Conclusion

In Australia, Canada and the USA married males enjoyed a wage premium over never married males during the early 1990s. When the samples were restricted to men who worked full-time full-year the size of the marriage premium varied with the wife's degree of attachment to the paid labour market in line with the predictions of the specialisation hypothesis. Amongst married men those with wives who did not work had the largest premiums, followed by men with wives working part-time. Men with wives who worked full-time had the smallest premium. However the differences in the size of the marriage premiums were not always statistically significant. In the Australian, US and Canadian 1994 samples the wpt and wnw premiums were not significantly different. In the Canadian 1991 sample the wpt and wft premiums were not significantly different.

The analysis presented here considered the possibility that the wives' degree of attachment to the labour market was endogenous in the husband's wage equation. I could not find an adequate instrument for the wives degree of attachment to the labour market for the US and Canada. The Australian instrument was more effective and analysis of the Australian samples suggests that the labour supply of wives was exogenous in the husbands' wage equation. In the rest of the analysis I assumed that the wives' labour supply was exogenous. In other words I assumed away the possibilities that husbands' wages impacted negatively on wives' labour

supply, and that there was a relationship between unobserved factors that impacted on husbands' wages and wives' hours.

Cross-country comparison of the sizes of the disaggregated marriage premiums revealed that they were largest in the USA and smallest in Australia in both time periods. According to Juhn *et al.* decompositions of the relevant wage differences US married men held more specialisation related human capital than Canadian and Australian married men in both periods. The US return (relative to unmarried men) to that human capital was larger than the Australian return and much the same size as the Canadian return. A possible explanation for why US married men held more specialisation related human capital is that US couples take the most advantage of the opportunity to increase the husband's holding of unobserved human capital afforded by the degree of the wife's attachment to the paid labour market. A motivation for this, at least in comparison to Australia, is that the US return to unobserved human capital appears to have been higher. Another motivation could be that the extent of sex based pay discrimination is greater in the US.

Over the early 1990s there was a reduction in the size of the male marriage premium in all examined countries. The sizes of the disaggregated premiums tended also to decrease over this period. A Juhn *et al.* decomposition of the change in the wage gaps between US never married and married men (grouped by the employment status of their wives) reveals that specialisation could explain this phenomenon. Over the early 1990s the amount of unobserved human capital held by American married men fell, as did the return to that human capital. Since the return to observed human capital for married men increased over the same period, it is possible that US couples were less motivated to take advantage of the specialisation opportunities in the later period.

In the early 1990's the US premium advantage over Canada increased in size, from 1.4 to 5.6 percentage points, while the US premium advantage over Australian fell from a maximum of 7.5 to 4.6 percentage points. These trends were consistent across all married males irrespective of the degree of their wives' labour force attachment.

Specialisation can explain some of the Australia-US dynamics, since there was a marked reduction in the cross-country gap in specialisation related human capital held by married men. Over the early 1990s the Australian and US returns to specialisation fell by much the same extent. Combined with the finding that over the same time the US return to observed human capital increased relative to the Australian return, this suggests that the motivation for US couples, relative to Australian couples, to take advantage of specialisation opportunities may have decreased. However did Australian couples in which the wives were not working full-time increase their extent of specialisation, or was there an increase in the propensity for husbands to take advantage of that specialisation?

However, the Canada-US dynamics were inconsistent with changes in the relative quantity and return to specialisation. Whilst the US premiums increased in size relative to the Canadian premiums, US holdings of specialisation related human capital fell, relative to Canadian holdings. Also, US and Canadian returns to specialisation were much the same in both periods, relative to the return to observed human capital.

In total this analysis provided some support for the specialisation hypothesis as an explanation for the male marriage premium, although specialisation was not able to explain changes over time in the US-Canadian relative premiums. An interesting question arising from this analysis is why the return to unobserved specialisation related human capital fell by much the same extent in all the countries over the early 1990s.

Appendix 5.A: Definitions of Characteristics Used in the Analysis

	Australia		Canada		USA	
	1989	1994	1991	1994	1991	1994
Hourly wage	Based on annual earnings. Based on weekly earnings	Based on weekly earnings	Based on annual earnings	As for 1991	Based on annual earnings	As for 1991
Education				As for 1991		As for 1991
Tertiary	Bachelors degree at least	Bachelors degree at least	Bachelors degree at least		Bachelors degree at least	
Certificate/ Diploma	Certificate, diploma	Diploma	Trade certificate, diploma		Associate degree	
Post-secondary	Trade certificate	Vocational qualification	Some post-secondary		Some college	
Secondary	Higher school certificate		11-13 years of schooling		High school diploma	
Location	Capital cities	As for 1989	City of 100, 000 + population	As for 1991	City of 2.5 million + population	As for 1991
Ethnicity	Migrant, not from UK	Migrant	Spoken language is not French or English	As for 1991	Blacks	As for 1991
Number of dependent children	Number of dependent children aged less than 18	<18	Number of dependent children aged less than 18		Number of dependent children aged less than 18	
Age of youngest dependent child			< 1, 2-4, 5-10, 11-16			
Log household property income						
Industry of husband's job	Mining, manufacturing, telecommunications and utilities, construction, wholesale and retail trade, finance, government, community services, other services.					

Appendix 5.B: Summary of Main Characteristics Used in the Analysis Currently Married and Never Married Males aged 20-65 Working Full-time for Wages and Salaries: Means (%) with standard deviations in brackets

	Australia 1989 (a)	Australia 1989 (b)	Canada 1991 (a)	USA 1991 (a)
Currently married	88.3	86.8	89.7	
Log hourly wage	2.62	2.59	2.78	2.56
(in home currency)	(0.39)	(0.36)	(0.54)	(0.56)
Age	39.02	38.61	40.16	39.78
	(10.41)	(10.47)	(9.93)	(10.45)
Location	69.7	69.4	42.2	32.8
Ethnicity	17.3	17.7	14.8	7.0
Education				
Bachelor	16.2	16.3	17.1	28.6
Certificate/Diploma	16.3	16.0	31.9	8.0
Post-secondary	28.0	27.7	7.1	18.2
Secondary	11.4	11.3	27.0	34.1
N° of observations	4 712	5 127	6 284	4 656

(a) Males working full-time full-year with wage based on annual earnings.
(b) Males working full-time in reference week with wage based on reference week earnings.

	Australia 1994 (b)	Canada 1994 (a)	USA 1994 (a)
Currently married	83.1	89.6	
Log hourly wage	2.72	2.87	2.63
(in home currency)	(0.44)	(0.51)	(0.61)
Age	39.50	40.38	39.52
	(10.13)	(9.63)	(10.37)
Location	63.2	58.7	35.4
Ethnicity	28.4	12.8	7.2
Education			
Bachelor	18.5	20.3	31.3
Certificate/Diploma	10.8	34.0	8.3
Post-secondary	29.0	7.3	18.3
Secondary	41.8	25.6	31.7
N° of observations	2 462	10 316	18 864

(a) Males working full-time full-year with wage based on annual earnings.
(b) Males working full-time in reference week with wage based on reference week earnings.

5.B.1 Currently married men

	Australia 1989 (a)	**Australia 1989** (b)	**Canada 1991** (a)	**USA 1991** (a)
Log hourly wage (in home currency)	2.63 (0.38)	2.61 (0.35)	2.80 (0.54)	2.59 (0.55)
Age	40.04 (10.14)	39.83 (10.15)	40.99 (9.68)	40.70 (10.30)
Location	68.9	68.5	41.0	31.4
Ethnicity	17.9	18.1	15.0	6.4
Education				
Bachelor	15.4	15.3	16.1	27.4
Certificate/Diploma	16.4	16.1	32.3	8.0
Post-secondary	28.7	28.6	6.9	18.4
Secondary	10.6	10.3	26.7	34.7
N° of observations	4 161	4 449	5 634	4 098

	Australia 1994 (b)	**Canada 1994** (a)	**USA 1994** (a)
Log hourly wage (in home currency)	2.74 (0.45)	2.87 (0.51)	2.68 (0.60)
Age	41.25 (9.50)	40.38 (9.63)	40.83 (10.12)
Location	62.8	58.2	34.0
Ethnicity	29.9	13.0	6.6
Education			
Bachelor	18.0	20.3	30.5
Certificate/Diploma	11.0	34.0	8.4
Post-secondary	30.5	7.3	18.5
Secondary	40.5	25.6	32.2
N° of observations	2 047	9 243	15 977

5.B.2 Never married men

	Australia 1989 (a)	Australia 1989 (b)	Canada 1991 (a)	USA 1991 (a)
Log hourly wage	2.51	2.51	2.60	2.36
(in home currency)	(0.45)	(0.38)	(0.54)	(0.60)
Age	31.29	30.61	32.95	33.04
	(9.08)	(8.89)	(9.15)	(9.04)
Location	75.9	75.2	52.5	42.8
Ethnicity	13.4	14.9	13.2	11.7
Education				
Bachelor	22.1	22.9	25.7	36.9
Certificate/Diploma	16.2	15.2	28.3	8.1
Post-secondary	22.7	22.4	8.6	17.2
Secondary	17.6	17.9	27.5	30.1
N° of observations	551	678	650	558

	Australia 1994 (b)	Canada 1994 (a)	USA 1994 (a)
Log hourly wage	2.60	2.71	2.40
(in home currency)	(0.38)	(0.51)	(0.61)
Age	30.86	34.54	32.24
	(8.48)	(8.95)	(8.55)
Location	64.4	63.1	43.0
Ethnicity	20.4	10.9	10.4
Education			
Bachelor	21.0	24.0	36.0
Certificate/Diploma	9.6	32.8	7.8
Post-secondary	21.2	9.6	17.6
Secondary	48.2	23.8	28.9
N° of observations	415	1 073	2 887

(a) Males working full-time full-year with wage based on annual earnings.
(b) Males working full-time in reference week with wage based on reference week earnings.

5.B.3 Currently married men with wives not working in the paid labour market

	Australia 1989 (a)	**Australia 1989** (b)	**Canada 1991** (a)	**USA 1991** (a)
Log hourly wage	2.63	2.59	2.83	2.64
(in home currency)	(0.38)	(0.37)	(0.55)	(0.59)
Age	41.20	40.89	42.51	42.6
	(10.88)	(10.92)	(10.66)	(10.69)
Location	66.1	65.5	38.1	37.1
Ethnicity	19.7	20.2	17.4	5.7
Education				
Bachelor	12.5	12.6	13.9	26.4
Certificate/Diploma	14.5	14.6	31.6	7.0
Post-secondary	30.6	30.2	5.8	15.9
Secondary	9.0	8.6	25.0	35.1
N° of observations	1 554	1 690	1 797	1 044

	Australia 1994 (b)	**Canada 1994** (a)	**USA 1994** (a)
Log hourly wage	2.75	2.91	2.72
(in home currency)	(0.43)	(0.52)	(0.67)
Age	41.46	42.38	42.37
	(10.02)	(10.25)	(10.73)
Location	62.2	54.0	39.4
Ethnicity	30.1	14.9	5.7
Education			
Bachelor	15.9	17.1	29.7
Certificate/Diploma	10.8	34.6	6.7
Post-secondary	30.3	5.8	16.0
Secondary	43.1	25.1	31.2
N° of observations	734	2 750	3 764

5.B.4 Currently married men with wives working part-time in the paid labour market

	Australia 1989 (a)	Australia 1989 (b)	Canada 1991 (a)	USA 1991 (a)
Log hourly wage	2.66	2.62	2.79	2.62
(in home currency)	(0.38)	(0.36)	(0.53)	(0.55)
Age	40.86	40.69	40.87	40.25
	(9.02)	(8.99)	(9.11)	(10.06)
Location	68.9	67.8	39.3	28.9
Ethnicity	15.0	14.9	14.3	4.5
Education				
Bachelor	15.2	15.0	16.6	29.2
Certificate/Diploma	17.7	17.2	32.2	7.7
Post-secondary	28.5	28.5	6.8	17.9
Secondary	10.2	10.0	28.0	33.6
N° of observations	1 201	1 269	1 350	818

	Australia 1994 (b)	Canada 1994 (a)	USA 1994 (a)
Log hourly wage	2.77	2.91	2.74
(in home currency)	(0.45)	(0.51)	(0.61)
Age	41.71	40.63	40.78
	(8.62)	(9.11)	(9.83)
Location	60.8	57.2	31.8
Ethnicity	25.3	11.0	4.0
Education			
Bachelor	18.4	20.0	33.1
Certificate/Diploma	12.5	36.6	8.7
Post-secondary	31.2	7.4	19.0
Secondary	37.9	25.4	31.5
N° of observations	615	2 166	3 220

(a) Males working full-time full-year with wage based on annual earnings.
(b) Males working full-time in reference week with wage based on reference week earnings.

5.B.5: Currently married men with wives working full-time in the paid labour market

	Australia 1989 (a)	Australia 1989 (b)	Canada 1991 (a)	USA 1991 (a)
Log hourly wage	2.62	2.61	2.77	2.55
(in home currency)	(0.37)	(0.33)	(0.54)	(0.53)
Age	38.06	37.91	39.96	39.96
	(9.92)	(9.89)	(9.08)	(10.08)
Location	72.1	72.4	44.0	29.7
Ethnicity	18.3	18.5	13.7	7.4
Education				
Bachelor	18.7	18.6	17.5	27.2
Certificate/Diploma	17.3	16.9	33.0	8.5
Post-secondary	26.9	26.8	7.7	19.7
Secondary	12.7	12.5	27.6	34.9
N° of observations	1 406	1 490	2 487	2 236

(a) Males working full-time full-year with wage based on annual earnings.
(b) Males working full-time in reference week with wage based on reference week earnings.

	Australia 1994 (b)	Canada 1994 (a)	USA 1994 (a)
Log hourly wage	2.72	2.88	2.63
(in home currency)	(0.47)	(0.49)	(0.56)
Age	40.62	40.44	40.21
	(9.62)	(9.04)	(9.89)
Location	65.2	61.4	32.5
Ethnicity	33.6	12.9	8.0
Education			
Bachelor	19.8	21.6	29.8
Certificate/Diploma	10.0	32.7	9.0
Post-secondary	30.2	7.5	19.3
Secondary	40.0	26.4	32.8
N° of observations	698	4 327	8 993

(a) Males working full-time full-year with wage based on annual earnings.
(b) Males working full-time in reference week with wage based on reference week earnings.

Appendix 5.C: Estimating the male marriage premium

(The coefficients from OLS estimation of the log hourly wages of currently married and never married men working full-time with t-statistics in parentheses: Australia 1989 & 1994, Canada 1991 & 1994 and the USA 1991 & 1994)

	Australia 1989 (a)	Australia 1989 (b)	Canada 1991 (a)	USA 1991 (a)
Constant	1.610	1.789	1.281	0.335
	(21.895)	(28.614)	(12.623)	(3.247)
Currently married	*0.079*	*0.088*	*0.134*	*0.146*
	(4.574)	*(6.050)*	*(5.968)*	*(6.338)*
Age	0.038	0.286	0.051	0.074
	(9.850)	(8.675)	(10.037)	(14.135)
Age squared	-4.11E-04	-3.26E-04	-5.24E-04	-7.40E-04
	(-8.925)	(-8.171)	(-8.620)	-(11.830)
Education				
Bachelor	0.372	0.409	0.455	0.663
	(22.559)	(28.518)	(20.145)	(25.763)
Certificate/Diploma	0.203	0.212	0.232	0.461
	(12.454)	(14.859)	(11.661)	(13.731)
Post-secondary	0.109	0.111	0.184	0.403
	(7.792)	(9.083)	(6.261)	(14.656)
Secondary	0.109	0.134	0.153	0.294
	(5.870)	(8.226)	(7.446)	(11.797)
Adjusted R squared	0.1425	0.1717	0.1030	0.2423
N° of observations	4 712	5 127	6 284	4 656

(a) Males working full-time full-year with wage based on annual earnings.
(b) Males working full-time in reference week with wage based on reference week earnings.

	Australia 1994 (b)	Canada 1994 (a)	USA 1994 (a)
Constant	1.929	0.886	0.326
	(15.272)	(11.630)	(5.952)
Currently Married	*0.092*	*0.092*	*0.133*
	(3.609)	*(5.869)*	*(11.816)*
Age	0.030	0.075	0.077
	(4.502)	(19.738)	(27.561)
Age squared	-3.39E-04	-7.64E-04	-7.60E-04
	(-4.181)	(-16.977)	(-22.707)
Education			
Bachelor	0.340	0.424	0.713
	(14.381)	(25.336)	(52.083)
Certificate/Diploma	0.164	0.224	0.455
	(5.698)	(14.449)	(25.616)
Post-secondary	0.020	0.185	0.372
	(0.990)	(8.480)	(25.172)
Secondary		0.126	0.274
		(7.765)	(20.111)
Adjusted R squared	0.1135	0.1428	0.2622
N° of observations	2 462	10 316	18 864

(a) Males working full-time full-year with wage based on annual earnings.
(b) Males working full-time in reference week with wage based on reference week earnings.

Appendix 5.D: Estimating the disaggregated male marriage premium with wives' labour supply exogenous

(The coefficients from OLS estimation of the log hourly wages of currently married and never married men working full-time with t-statistics in parentheses: Australia 1989 & 1994, Canada 1991 & 1994 and the USA 1991 & 1994)

	Australia 1989 (a)	**Australia 1989** (b)	**Canada 1991** (a)	**USA 1991** (a)
Constant	1.621	1.796	1.233	0.328
	(21.884)	(28.498)	(12.114)	(3.180)
Wife not working	*0.092*	*0.089*	*0.185*	*0.203*
	(4.862)	*(5.567)*	*(7.505)*	*(7.592)*
Wife working	*0.093*	*0.097*	*0.123*	*0.181*
part-time	*(4.716)*	*(5.735)*	*(4.821)*	*(6.566)*
Wife working	*0.060*	*0.083*	*0.105*	*0.111*
full-time	*(3.220)*	*(5.212)*	*(4.454)*	*(4.642)*
Age	0.037	0.028	0.054	0.074
	(9.634)	(8.491)	(10.478)	(14.226)
Age squared	-4.07E-04	-3.22E-04	-5.56E-04	-7.47E-04
	(-8.764)	(-8.008)	(-9.120)	(-11.972)
Education				
Bachelor	0.375	0.409	0.463	0.670
	(22.701)	(28.483)	(20.486)	(26.070)
Certificate/Diploma	0.205	0.213	0.238	0.470
	(12.557)	(14.855)	(11.948)	(14.028)
Post-secondary	0.109	0.111	0.193	0.413
	(7.832)	(9.087)	(6.545)	(15.026)
Secondary	0.111	0.134	0.160	0.301
	(5.987)	(8.236)	(7.773)	(12.094)
Adjusted R squared	0.1435	0.1716	0.1064	0.2456
N° of observations	4 712	5 127	6 284	4 656

(a) Males working full-time full-year with wage based on annual earnings.
(b) Males working full-time in reference week with wage based on reference week earnings.

	Australia 1994 (b)	**USA 1994** (a)	**Canada 1994** (a)
Constant	1.937	0.308	0.897
	(15.279)	(5.627)	(11.356)
Wife not working	*0.108*	*0.198*	*0.119*
	(3.826)	*(14.572)*	*(6.800)*
Wife working	*0.108*	*0.178*	*0.101*
part-time	*(3.657)*	*(12.784)*	*(5.647)*
Wife working	*0.064*	*0.093*	*0.071*
full-time	*(2.281)*	*(7.916)*	*(4.327)*
Age	0.030	0.078	0.076
	(4.429)	(27.924)	(19.962)
Age squared	-3.36E-04	-7.74E-04	-7.77E-04
	(-4.123)	(-23.157)	(-17.232)
Education			
Bachelor	0.342	0.719	0.428
	(14.444)	(52.573)	(25.517)
Certificate/Diploma	0.163	0.465	0.225
	(5.669)	(26.229)	(14.517)
Post-secondary	0.020	0.382	0.189
	(0.989)	(25.799)	(8.630)
Secondary		0.282	0.128
		(20.714)	(7.895)
Adjusted R squared	0.1145	0.2673	0.1441
N° of observations	2 462	18 864	10 316

(a) Males working full-time full-year with wage based on annual earnings.
(b) Males working full-time in reference week with wage based on reference week earnings.

Appendix 5.E: Estimating the disaggregated male marriage premium with wives' labour supply endogenous

(The coefficients from OLS estimation of the log hourly wages of currently married and never married men working full-time with t-statistics in parentheses: Australia 1989 & 1994, Canada 1991 & 1994 and the USA 1991 & 1994)

	Australia 1989 (a)	**Australia 1989** (b)	**Canada 1991** (a)	**USA 1991** (a)
Constant	1.630	1.843	1.256	0.352
	(21.296)	(28.403)	(12.007)	(3.397)
Wife not working	*0.083*	*0.078*	*0.140*	*0.129*
	(4.455)	*(4.960)*	*(5.688)*	*(4.509)*
Wife working	*0.092*	*0.120*	*-0.097*	*0.291*
part-time	*(4.381)*	*(6.584)*	*(-1.168)*	*(3.933)*
Wife working	*0.071*	*0.089*	*0.133*	*0.147*
full-time	*(3.850)*	*(5.694)*	*(5.764)*	*(6.319)*
Age	0.037	0.026	0.053	0.073
	(9.193)	(7.509)	(9.987)	(13.899)
Age squared	-4.00E-04	-2.90E-04	-5.39E-04	-7.27E-04
	(-8.322)	(-7.016)	(-8.585)	(-11.558)
Education				
Bachelor	0.374	0.408	0.460	0.660
	(22.510)	(28.296)	(20.104)	(25.468)
Certificate/Diploma	0.203	0.210	0.235	0.459
	(12.428)	(14.637)	(11.671)	(13.579)
Post-secondary	0.109	0.110	0.186	0.400
	(7.798)	(9.003)	(6.261)	(14.351)
Secondary	0.110	0.131	0.156	0.293
	(5.889)	(8.023)	(7.516)	(11.637)
Adjusted R squared	0.1425	0.1730	0.1039	0.2417
N° of observations	4 712	5 127	6 284	4 656

(a) Males working full-time full-year with wage based on annual earnings.
(b) Males working full-time in reference week with wage based on reference week earnings.

	Australia 1994 (b)	**USA 1994** (a)	**Canada 1994** (a)
Constant	1.995	0.362	0.918
	(15.392)	(6.518)	(11.746)
Wife not working	*0.082*	*0.093*	*0.078*
	(2.986)	*(5.844)*	*(4.348)*
Wife working	*0.137*	*0.260*	*0.142*
part-time	*(4.233)*	*(4.580)*	*(3.672)*
Wife working	*0.089*	*0.138*	*0.096*
full-time	*(3.195)*	*(12.128)*	*(5.989)*
Age	0.027	0.076	0.073
	(3.891)	(26.759)	(18.838)
Age squared	-2.99E-04	-7.40E-04	-7.43E-04
	(-3.592)	(-21.840)	(-16.060)
Education			
Bachelor	0.338	0.702	0.420
	(14.268)	(50.400)	(24.806)
Certificate/Diploma	0.159	0.444	0.221
	(5.506)	(24.650)	(14.184)
Post-secondary	0.018	0.362	0.181
	(0.858)	(23.944)	(8.223)
Secondary		0.264	0.123
		(19.049)	(7.528)
Adjusted R squared	0.1146	0.2628	0.1430
N° of observations	2 462	18 864	10 316

(a) Males working full-time full-year with wage based on annual earnings.
(b) Males working full-time in reference week with wage based on reference week earnings.

Appendix 5.F: The coefficients from OLS estimation of the log hourly wages of men working full-time grouped by their degree of specialisation with t-statistics in parentheses: Australia 1989 & 1994, Canada 1991 & 1994 and the USA 1991 & 1994

Australia 1989 (a)	Never Married	Married Wife working full-time	Married Wife working part-time	Married Wife not working
Constant	1.875	1.613	1.707	1.468
	(7.968)	(12.573)	(9.358)	(10.285)
Age	0.027	0.039	0.036	0.050
	(2.019)	(5.875)	(4.087)	(7.160)
Age squared	-3.38E-04	-0.30E-04	-3.825E-04	-5.467E-04
	(-1.950)	(-5.113)	(-3.652)	(-6.810)
Education				
Bachelor	0.363	0.390	0.382	0.371
	(6.486)	(14.237)	(11.739)	(12.185)
Certificate/Diploma	0.246	0.238	0.190	0.170
	(4.071)	(8.530)	(6.151)	(5.943)
Post-secondary	0.138	0.133	0.112	0.081
	(2.487)	(5.351)	(4.165)	(3.569)
Secondary	0.082	0.150	0.121	0.085
	(1.379)	(4.820)	(3.257)	(2.452)
Adjusted R squared	0.0895	0.1749	0.1283	0.1292
N° of observations	551	1 406	1 201	1 554

Australia 1989 (b)	Never Married	Married Wife working full-time	Married Wife working part-time	Married Wife not working
Constant	1.957	1.789	1.863	1.789
	(11.257)	(16.101)	(11.353)	(14.352)
Age	0.022	0.034	0.028	0.033
	(2.195)	(5.788)	(3.460)	(5.408)
Age squared	-2.74E-04	-3.91E-04	-3.06E-04	-3.746E-04
	(-2.084)	(-5.331)	(-3.232)	(5.266)
Education				
Bachelor	0.359	0.385	0.467	0.417
	(8.585)	(16.215)	(15.883)	(15.274)
Certificate/Diploma	0.203	0.193	0.239	0.209
	(4.381)	(7.926)	(8.517)	(8.170)
Post-secondary	0.143	0.098	0.132	0.942
	(3.397)	(4.538)	(5.451)	(4.592)
Secondary	0.129	0.126	0.176	0.101
	(2.879)	(4.646)	(0.176)	(3.206)
Adjusted R squared	0.1075	0.1868	0.1870	0.1538
N° of observations	678	1 490	1 269	1 690

(a) Males working full-time full-year with wage based on annual earnings.
(b) Males working full-time in reference week with wage based on reference week earnings.

Canada 1991	Never Married	Married Wife working full-time	Married Wife working part-time	Married Wife not working
Constant	1.329	1.344	0.864	1.473
	(4.764)	(7.410)	(3.541)	(7.368)
Age	0.052	0.055	0.078	0.050
	(3.490)	(6.083)	(6.510)	(5.223)
Age squared	-5.58E-04	-5.82E-04	-8.24E-04	-4.94E-04
	(-2.901)	(-5.325)	(-5.851)	(-4.557)
Education				
Bachelor	0.326	0.490	0.449	0.498
	(4.239)	(13.170)	(9.439)	(11.852)
Certificate/Diploma	0.240	0.220	0.223	0.264
	(3.145)	(6.591)	(5.349)	(7.723)
Post-secondary	0.214	0.167	0.281	0.124
	(2.229)	(3.584)	(4.514)	(2.158)
Secondary	0.180	0.156	0.139	0.162
	(2.335)	(4.572)	(3.230)	(4.496)
Adjusted R squared	0.0616	0.0946	0.1139	0.0980
N° of observations	650	2 487	1 350	1 797

USA 1991	Never Married	Married Wife working full-time	Married Wife working part-time	Married Wife not working
Constant	-0.422	0.570	0.265	0.187
	(-1.316)	(3.763)	(1.004)	(0.809)
Age	0.120	0.069	0.087	0.087
	(6.873)	(9.044)	(6.696)	(7.857)
Age squared	-1.52E-03	-6.82E-04	-8.6E-04	-8.58E-04
	(-6.607)	(-7.402)	(-5.568)	(-6.841)
Education				
Bachelor	0.765	0.623	0.552	0.801
	(8.403)	(16.487)	(9.294)	(16.511)
Certificate/Diploma	0.625	0.445	0.347	0.517
	(5.389)	(9.414)	(4.379)	(7.546)
Post-secondary	0.611	0.362	0.354	0.453
	(6.123)	(9.175)	(5.526)	(8.448)
Secondary	0.463	0.294	0.230	0.277
	(4.985)	(8.031)	(3.973)	(6.071)
Adjusted R squared	0.1994	0.2110	0.2297	0.3210
N° of observations	558	2 236	818	1 044

Australia 1994	Never Married	Married Wife working full-time	Married Wife working part-time	Married Wife not working
Constant	1.832	2.162	1.540	2.389
	(8.081)	(7.555)	(4.695)	(9.009)
Age	0.034	0.023	0.056	0.112
	(6.657)	(1.578)	(3.540)	(0.860)
Age squared	-3.83E-04	-2.61E-04	-6.55E-04	-1.12E-04
	(-2.199)	(-1.468)	(-1.225)	(-0.738)
Education				
Bachelor	0.362	0.335	0.311	0.359
	(7.886)	(7.099)	(6.321)	(7.975)
Certificate/Diploma	0.179	0.099	0.184	0.188
	(2.956)	(1.649)	(3.252)	(3.599)
Post-secondary	0.068	0.005	-0.051	0.074
	(1.526)	(0.127)	(-1.225)	(2.035)
Adjusted R squared	0.1754	0.0789	0.1122	0.0846
N° of observations	415	698	615	734

Canada 1994	Never Married	Married Wife working full-time	Married Wife working part-time	Married Wife not working
Constant	1.057	1.149	0.689	0.996
	(5.419)	(9.063)	(3.863)	(6.478)
Age	0.070	0.071	0.095	0.078
	(6.351)	(11.267)	(10.820)	(10.637)
Age squared	-7.32E-04	-7.38E-04	-9.99E-04	-8.09E-04
	(-5.125)	(-9.716)	(-9.608)	(9.617)
Education				
Bachelor	0.228	0.347	0.308	0.413
	(5.806)	(18.344)	(10.873)	(15.562)
Certificate/Diploma	0.161	0.122	0.105	0.178
	(4.478)	(7.286)	(4.387)	(8.352)
Post-secondary	0.098	0.071	0.091	0.156
	(1.816)	(2.542)	(2.228)	(3.811
Adjusted R squared	0.1155	0.1297	0.1318	0.135
N° of observations	1 073	4 327	2 166	2 750

USA 1994	Never Married	Married Wife working full-time	Married Wife working part-time	Married Wife not working
Constant	0.231	0.59	0.243	0.339
	(1.644)	(9.260)	(1.695)	(2.348)
Age	0.101	0.073	0.010	0.090
	(12.682)	(17.884)	(13.999)	(12.890)
Age squared	-1.16E-03	-7.34E-04	-1.00E-03	-8.79E-04
	(-10.808)	(-14.940)	(-11.883)	(-11.085)
Education				
Bachelor	0.413	0.469	0.461	0.697
	(17.365)	(37.425)	(20.453)	(32.042)
Certificate/Diploma	0.234	0.205	0.236	0.359
	(6.348)	(10.709)	(6.670)	(9.446)
Post-secondary	0.140	0.136	0.164	0.252
	(4.781)	(9.516)	(6.249)	(9.483
Adjusted R squared	0.1985	0.2104	0.2344	0.2925
N° of observations	2 887	8 993	3 220	3 764

USA 1994	Never Married	Married Wife working full-time	Married Wife working part-time	Married Wife not working
Constant	0.107	0.590	0.085	0.187
	(0.759)	(7.168)	(0.586)	(1.321)
Age	0.099	0.072	0.098	0.085
	(12.391)	(17.615)	(13.843)	(12.550)
Age squared	-1.12E-03	-7.09E-04	-9.80E-04	8.30E-04
	(-10.476)	(-14.558)	(-11.639)	(-10.685)
Education				
Bachelor	0.581	0.664	0.639	0.931
	(15.857)	(33.804)	(16.887)	(33.295)
Certificate/Diploma	0.422	0.401	0.415	0.593
	(8.677)	(16.470)	(8.894)	(14.336)
Post-secondary	0.307	0.332	0.343	0.486
	(7.626)	(15.941)	(8.525)	(15.330)
Secondary	0.224	0.250	0.221	0.355
	(5.999)	(12.840)	(5.844)	(12.920)
Adjusted R squared	0.2081	0.2246	0.2422	0.3224
N° of observations	2 887	8 993	3 220	3 764

Appendix 5.G: Components of Juhn *et al.* decomposition of the differences in the residual log wage gap between males grouped by supposed intensity of specialisation: USA 1994 - USA 1991

	Percentage point difference in log wages (D_i)	Mean residual of first named group	Percentile of mean residual in own year's distribution of second named group	Corresponding mean residual in USA 1991 distribution of second named group	$D_{USA\text{-}1994} - D_{USA\text{-}1991}$
	Wife not working – never married				
USA 1994	0.32	0.2356	68.0	0.2691	0.03
USA 1991	0.29	0.3702	78.3		
	Wife working part-time - never married				
USA 1994	0.34	0.2048	65.0	0.2352	0.07
USA 1991	0.27	0.2895	69.0		
	Wife working full-time – never married				
USA 1994	0.23	0.1127	57.4	0.1687	0.03
USA 1991	0.20	0.2102	61.1		

Appendix 5.H: Components of the Juhn *et al.* decomposition of the cross-country differences in the residual log wage gaps between males grouped by supposed intensity of specialisation using USA as the base

5.H.1: First time period

Country	Percentage point difference in log wages (D_i)	Mean residual of first named group	Percentile of mean residual in own country's nm distribution of second named group	Corresponding mean residual in USA 1991 distribution of second named group	$D_i - D_{USA}$
	Wife not working - never married				
Australia (a)	0.11	0.1217	62.8	0.2184	-0.18
Australia (b)	0.08	0.0952	60.4	0.1937	-0.21
Canada	0.23	0.1825	59.6	0.1888	-0.06
USA	0.29	0.3702	78.3		
	Wife working part-time – never married				
Australia (a)	0.14	0.1239	63.4	0.2219	-0.13
Australia (b)	0.12	0.1064	65.3	0.2405	-0.15
Canada	0.19	0.1204	53.9	0.1367	-0.08
USA	0.27	0.2895	69.0		
	Wife working full-time – never married				
Australia (a)	0.10	0.0785	55.2	0.1558	-0.10
Australia (b)	0.11	0.0872	59.6	0.1888	-0.09
Canada	0.17	0.1015	51.7	0.1004	-0.03
USA	0.20	0.2102	61.1		

(a) Males working full-time full-year with wage based on annual earnings.
(b) Males working full-time in reference week with wage based on reference week earnings.

5.H.2: Second time period

Country	Percentage point difference in log wages (D_i)	Mean residual of first named group	Percentile of mean residual in own country's nm distribution of second named group	Corresponding mean residual in USA 1994 distribution of second named group	$D_i - D_{USA}$
	Wife not working – never married				
Australia	0.14	0.1071	65.3	0.2092	-0.18
Canada	0.16	0.1257	57.8	0.1208	-0.16
USA	0.32	0.2694	69.9		
	Wife working part-time – never married				
Australia	0.17	0.1048	65.3	0.2092	-0.17
Canada	0.19	0.1151	56.7	0.1071	-0.15
USA	0.34	0.2506	68.2		
	Wife working full-time – never married				
Australia	0.11	0.0630	59.8	0.1425	-0.09
Canada	0.16	0.0868	53.0	0.0711	-0.04
USA	0.20	0.1567	61.2		

CHAPTER SIX

UNRAVELLING THE RELATIONSHIP BETWEEN THE WAGES OF MARRIED MEN AND THEIR WIVES' LABOUR SUPPLY

6.1 Introduction

This chapter is concerned with further unravelling the relationship between the wife's labour supply and the husband's wage in Australia 1994, Canada 1994 and the USA 1994. Here the wives' labour supply appears as a continuous variable. Primarily, the analysis reported in this chapter was designed to answer the question of whether simultaneity bias exists in single equation estimates of the husband's wage and the wife's labour supply and secondly to establish the direction of causality between the two. In so doing it adds to the thematic analysis of this thesis. If the empirical analysis showed that there was some causality running from wives' hours to husbands' wage it provides more support for specialisation.

The analysis presented in Chapter Five investigated to what extent traditional gender based specialisation within marriage could explain the dynamics of cross-country differences in the male marriage premium. The extent of specialisation was modelled by wives' degree of attachment to the paid labour market - whether they worked full-time, part-time or not at all. I instrumented the wives' labour supply to test for its endogeneity. However, the explanatory ability of the available instruments was inadequate. They proved poor predictors of wives who worked part-time, especially amongst Canadian and US women. I continued the analysis on the presumption that the wives' labour supply was exogenous and found some empirical evidence to support the existence of a causal relationship between specialisation within marriage and the husband's wage. It was anticipated that it would be easier to instrument continuous hours than the set of dummy variables used in Chapter Five.

I also investigated whether specialisation was more important to couples with, and without, dependent children. Analyses of household behaviour, such as Apps and

Rees (1994), assume that the nature of the household decision making process depends on the presence of children. It is possible that the mechanics of the specialisation process also differs with the presence of children. Once couples have children their home production will tend to become more valuable and demanding. Becker (1985) claims that caring for children is one of the only activities undertaken in the home that demands more effort than the average man's job. Having children increases the pressure to specialise. Similarly, in terms of labour supply, an increase in the husband's wage may be more of an inducement for a wife with children to reduce her hours in the paid labour force than for a wife without children.

The analysis presented here suggests that wives' hours were endogenous in the husbands' wage equation, as was husbands' wage in the wives' hours equation. Having controlled for endogeneity the analysis suggested that specialisation was undertaken by couples with dependent children. However, amongst couples without dependent children there was no evidence of specialisation. The estimated marginal benefits of specialisation decreased as the wife worked longer hours.

A caveat is that the instrument for wives' hours was still far from perfect, especially for Canadian and US couples with dependent children.

In the next section I briefly outline the model to be estimated, and follow up with a description of the estimation procedure in section 6.3. In section 6.4 I describe the data and present the results in section 6.5. Conclusions appear in section 6.6.

6.2 Modelling the Simultaneous Determination of the Wives' Labour Supply and the Husbands' Wage

Models of the labour market outcomes of married couples tend to focus on the interrelationship between the labour supply of the husband and wife. The husband's wage is usually assumed to be exogenous and the wife's wage endogenous, determined jointly with her labour supply. Since I am concerned

with unravelling the relationship between the wife's labour supply and the husband's wage I endogenised the husband's wage within the traditional framework of household labour supply. I also endogenised the husband's labour supply. Moffit (1984), Lundberg (1985) and Hotchkiss (1991) demonstrate and discuss the importance of the simultaneous determination of wages and hours.

The inclusion of husbands' hours in the husbands' wage equation may provide more information about the link between specialisation and increased productivity. It could show whether extra time spent on the job directly affects productivity and earnings. However, an important component of the specialisation process is effort, and that is not necessarily depicted in hours worked.

Endogenising wives' hours allows the effect of wives' hours on husbands' earnings to be viewed independently of the following effects:

- economic models of the labour supply of married women assume that they are less apt to work in the paid labour market the higher their husbands' income; and

- wives' hours may be correlated with, but not causally linked to, husbands' wage. This correlation could be positive or negative. An explanation for negative correlation is that males and females select into marriage on the basis of unobservable male characteristics that are valued by the labour market and female characteristics which encourage the wife to spend less time in the labour market. Positive correlation would be evidenced if selection into marriage were made on the basis of characteristics valued by the paid labour market; men's unobserved characteristics and women's observed and unobserved characteristics.

I differentiated the couples on the basis of the presence of dependent children. The primary reason for the differentiation was that there is more need for specialisation when children are present. Child-care is one of the most time and energy intensive activities undertaken in the household. When couples have children the value of work undertaken in the home tends to increase. Apps and

Rees (1994) also argued the household decision-making process depends on the presence of children. It is possible that the nature of the relationship between specialisation and wives' labour supply differs depending on the presence of dependent children.

Cross-section analysis has found a higher marriage premium for men with dependent children (for example, Cornwell and Rupert, 1997; Korenman and Neumark, 1991). My findings, reported in Chapter Four, were mixed. In regressions, where married men included men living in de-facto relationships, I found that Canadian men with dependent children did receive a higher premium, regardless of the age of their children. Australian men with children older than six also received a higher premium. But the size of the estimated American premium did not vary with parenthood.

However, at least in terms of the wives' labour market outcomes, research by Shapiro and Mott (1994) suggests that the presence of children may be a deceptive point of differentiation. Research has shown that a mother's proclivity to work depends, less on the age and number of her children, than on her labour supply history. Her labour supply history depends crucially on her level of desire to have a career before marriage and parenthood (Shapiro and Mott, 1994, Rexroat and Shehan, 1984 and Desai and Waite, 1992). Shapiro and Mott (1994) concluded that a married woman's proclivity to work around the time of having her first child is a good indication of career intentions. Desai and Waite's (1992) findings confirmed this. They found that planned homemakers return to work more slowly in the baby's first year than those with career/employment aspirations. When planned home-makers made a decision on whether to return to work family finances had a stronger effect than it did in the similar decision making process of other women. Morgan (1994) finds that women who plan on remaining employed after childbirth, tend to delay the birth of their first child.

Not having information as to work intentions of the wives at the time of their first child, I opted to split the sample into two: couples with and without dependent children. However, when analysing each sub-sample I am aware that I am not dealing with homogeneous women in terms of the responsiveness of their

proclivity to work given the explanatory variables, such as education. Amongst couples with dependent children there may be women who will work continuously regardless of the age and number of their children. There will be those who will only take small breaks and go back to their old job. Others will return to work but in a downgraded position with the same number of hours. Others will return to their old job but work part-time in a job sharing arrangement. And there will be those that leave the work force altogether. Although we describe the wife's ability to help her husband's career on the basis of the hours she works we can see that the number of hours she works could have very different impacts on her husband's career.

Regardless of the differing desires to work, couples without dependent children can be thought of as comprising three types; those who plan to never have children, those who plan to have children and those with children older than 18. Unfortunately I am unable to identify these women.

I assumed a single family-utility model. This model assumes that the labour market outcomes of the husband and wife are the result of the maximisation of the husband's utility function[1]. The household head maximises a twice differentiable and strictly quasi-concave utility function, the arguments of which are consumption of a composite good, the result of combining goods and services purchased from the market and home production, and the leisure time of both husband and wife. Utility is maximised subject to a budget constraint in which all earnings are pooled.

The utility function is of the form:

$$\mathbf{U = U(c^f, l_W, l_H, e)} \qquad \mathbf{(6.1)}$$

where c^f represents the family's consumption of the composite good (a combination of home production and goods and services purchased in the market), l_W and l_H are the leisure hours of the wife and husband respectively and e is an

[1]A model that assumes a single family-utility function has an important limitation. It fails to incorporate the process by which resources are distributed within households. I assumed that the resources are shared in a way that rewards the wife accordingly if she provides wage-enhancing support to her husband's career through specialisation.

unobservable error term varying from one couple to another. The error term represents differences between couples in terms of tastes for leisure and goods consumption.

The following equations represent constraints on the family's utility maximisation:

$$C^f = W_W H_W + W_H H_H + Y \quad (6.2)$$

$$K_W = 1 - H_W - l_W \quad (6.3)$$

$$K_H = 1 - H_H - l_H \quad (6.4)$$

$$W_H = g(K_W, H_H, X_H) \quad (6.5)$$

$$W_W = g(K_W, H_W, X_W) \quad (6.6)$$

where H_W and H_M are the hours worked in the paid labour market by the wife and husband respectively; k_W is the hours the wife devotes to activities at home and k_H is the hours the husband devotes to home production; X is a vector of exogenous determinants of the wage, such as education and work experience; and Y is non-labour income.

The time constraints are

$$T = l_W + H_W + k_W \quad (6.7)$$

$$T = l_H + H_H + k_H \quad (6.8)$$

where T is total time available.

The utility maximisation process yields demand curves for the goods and services purchased in the market, market labour supply functions, leisure functions for the husband and wife, home production functions for the husband and wife and wage functions for the husband and wife. I discarded the demand curves because they are outside the scope of my interest. Since the data sets only contain information on time spent in the labour market I also discarded the equations for supply of time to leisure and home production.

Amongst couples, with and without dependent children, I assumed that the degree of specialisation in the household was represented by wives' labour supply. The hours worked by the husband do not necessarily reflect the degree of specialisation. All husbands work full-time but, as Becker (1985) argued, the effort applied to each hour of work is very important. Hence two men working the same hours might expend different levels of effort, because they undertake different sorts of home production in terms of effort intensity. This, I hope, will be approximated by the wives' labour supply. She makes the decision about how much energy she has left over for work in the paid labour market, based on how much time and effort she is required to use in home production. The inverse of her effort level in home production is that of her husband.

My motivation is to unravel the relationship between the wife's hours, representing specialisation within the home, and the husband's wage. Thus, it is important to isolate linkages within that relationship. The two structural equations to be estimated are as follows:

$$\mathbf{W_H} = \alpha_0 + \alpha_1\mathbf{Ed_H} + \alpha_2\mathbf{Age_H} + \alpha_3\mathbf{Eth_H} + \alpha_4\mathbf{Loc} + \beta\mathbf{H_F} + \eta\mathbf{H_H} + \mathbf{e_{HW}} \qquad \mathbf{(6.9)}$$

$$\mathbf{H_W} = \phi_0 + \phi_1\mathbf{Ed_W} + \phi_2\,\mathbf{Age_W} + \phi_3\mathbf{Eth_W} + \phi_4\mathbf{Loc} + \phi_5\mathbf{W_W} + \phi_6\mathbf{Y} + \phi_7\mathbf{Kids} + \gamma\mathbf{W_M} + \lambda\mathbf{H_H} + \mathbf{v_{WH}} \qquad \mathbf{(6.10)}$$

where *Ed* represents dummies for highest education received; *Age* reflects years of work experience and this variable squared, *Eth* is an ethnicity dummy, *Loc* is a location dummy, *Kids* are dummies for the age and number of children[2] and e_{MW} and v_{FH} are errors in husbands' wage equation and wives' labour supply equation respectively. The specification of the male wage equation is a standard human capital based one.

The equation for wives' hours is a common specification of the type that Killingsworth (1983) has coined the second-generation labour supply function. Second generation models of labour supply are based on the presumption that the labour supply function is composed of two functions, rather than one continuous

[2] These variables are defined in Appendix 4.A.

function. If the wife's wage exceeds her reservation wage she works, and her labour supply (in hours) is assumed to be a continuous function of the explanatory variables described in equation 6.10. If her wage is less than or equal to her reservation wage she does not work, so her labour supply equals zero. The same observable variables and parameters affect both the decision to work and the amount of hours worked conditional on working.

6.3 Estimating the Model

Estimation of the structural form of the wives' hours equation is a complex process. The following description of the complications involved (leading to biased and/or inefficient parameter estimates), and procedures designed to deal with the complications, is informed primarily by Killingsworth (1983), Berndt (1991) and Maddala (1983). The complications are that:

- the wife's wage is not observable when she is not working;
- there could be sample selection bias in the estimated parameters of the wage equation for working wives;
- the wife's wage may be endogenous in her hours equation;
- the wife's labour market experience may be endogenous in her hours equation;
- the wife's labour supply includes positive hours and zero hours; and
- identification may not be assured.

Below I describe each of the complications and outline the approaches I have taken to deal with them.

The wife's wage is an explanatory variable in her labour supply equation (equation 6.10). However a wage is not observable for the wife if she is not working. The standard procedure is to estimate a wage equation for working wives and use the estimated coefficients to impute a wage for the non-workers.

$$\mathbf{W_W} = \varphi_0 + \varphi_1\mathbf{Ed_W} + \varphi_2\mathbf{Exp_W} + \varphi_3\mathbf{Eth_W} + \varphi_4\mathbf{Loc} + e_{WW} \qquad \textbf{(6.11)}$$

where e_{WW} is the error in the wife's wage equation. Estimation of a combined wage equation for wives who work full- and part-time is by no means unprecedented, although it could be argued that full-time and part-time workers are drawn from different segments of the labour market in terms of return to human capital. Few studies have considered this question, although we do know that US and Canadian women working full-time earn more per hour than their part-time counterparts and the reverse is true for Australian women. The majority of Australian women working part-time are employed in casual jobs, as opposed to permanent jobs. In Australia, casual workers should receive salary 'loadings' to compensate for the foregone benefits of permanent employment, so gross hourly earnings are likely to overstate the wage rates of casual workers[3]. Many women working part-time are employed in casual jobs.

Estimation of the structure of wages for wives using only wives who work is problematic if wives select into work on the basis of a characteristic(s) which also affect(s) their wage. For example a career minded woman might be more likely to work and also receive a higher wage in recognition of that career-mindedness. However career-mindedness is regarded as an unobservable variable in the sense that it is not included in the usual set of exogenous variables used to describe female wages, such as work experience, education and husbands' earnings. Hence the parameter estimates in 6.11 are inconsistent because the conditional expectation of the disturbance term is non zero and the disturbance term is correlated with the regressors.

[3] US evidence suggests that a dichotomy exists between part-time and full time work. Miller (1993) finds that part-time employment is concentrated within unskilled occupations providing limited access to training and advancement. Indeed Mincer and Ofek (1982) showed that part-time work experience in the USA did not lead to an increase in wages. They also found little evidence that continuing part-time employment led to higher wage rates than those received by people who had withdrawn entirely from the labour market for the same period. It appears that women do not move easily between part-time and full-time work in the USA. Furthermore the return to years of work experience could differ markedly between the two groups since the provision of training is more likely to be associated with full rather than part-time work. Hawke (1993) showed that a great deal of the US part-time/full-time wage differential could be explained by the woman's human capital characteristics if work experience was designated as part- or full- time. She did not find this to be the case for Australia however.

To correct for possible sample selection bias in the wives' wage equation I used Heckman's (1979) approach. I estimated the labour force participation equation for all women, whether working or not, by probit and calculated the inverse Mill's ratio from the resultant parameter estimates. The inverse Mill's ratio was included as a regressor in the wage equation for working wives. It acts as an instrument for the wife's unobserved career mindedness. Hence the wife's wage equation was estimated in its reduced form.

$$\mathbf{W_W = \varphi_0 + \varphi_1 Ed_W + \varphi_2 Exp_W + \varphi_3 Eth_W + \varphi_4 Kids + \varphi_5 Loc + \lambda Inverse\ Mill's\ Ratio + u} \quad \textbf{(6.12: working wives)}$$

$$\mathbf{Part_W = f(Ed_W, Age_W, Eth_W, Loc, Kids, Wage_H, Wage_W, Property\ Income)} \quad \textbf{(6.13: all wives)}$$

where $Part_W$ is an indicator function set to one if the wife works in the labour market and 0 otherwise. The inverse Mill's ratio is calculated from $\phi(f^{pred})/(1 - \Phi(f^{pred}))$ where (f^{pred}) is the predicted participation/indicator function, ϕ is the standard normal density function and Φ is the standard normal cumulative distribution function.

The wife's wage may be endogenous in her hours equation, for much the same reason that there could be sample selection bias in the wife's wage equation. For example there may be correlation between unmeasured factors, such as her taste for work, which affect labour supply and unmeasured factors which affect her wage such as her career motivation. So the wife's wage is instrumented in the wife's hours equation. The instrument is a combination variable constructed from the predicted values from the estimation of the reduced form wage equation for working wives, and the imputed value of wages for non-working wives.

Mroz (1987) concluded empirically that the wife's labour market experience can also be endogenous in her hours equation. A solution is to instrument experience with a variable such as age. Proxying labour market experience for women with age is problematic because many have interrupted careers, as they take time off work to care for children. Therefore, for wives with dependent children I have included variables based on the age and number of dependent children to provide

a more accurate measure of their years of work experience. On average the number of years a woman is absent from the work force is dependent on the number of children she has. Hence the number of dependent children is also included as an explanatory variable[4].

The wives' hours equation cannot be estimated by ordinary least squares because the dependent variable is censored at zero. It is a combination of positive hours and unobserved hours, which are given a zero value. Hence it is estimated by the Tobit procedure. In a sense, Tobit combines regression and probit frameworks, since Tobit not only predicts the number of hours worked for each worker but also produces the estimated probability that an individual works and thereby helps explain why a number of observations are clustered at zero hours.

Equations 6.9, 6.10 and 6.11 are identified because there are enough exogenous variables excluded from each equation to act as instrumental variables for the endogenous variables appearing as regressors in each equation. For example the husband's education, work experience and ethnicity are exogenous variables appearing in equation 6.9 which are excluded from equations 6.10 and 6.11. Similarly the wife's education, experience, ethnicity, household non-labour income and the ages and number of children appear as regressors in equations 6.10 and 6.11, but not in equation 6.9. Equation 6.8 is also identified with respect to equation 6.9. For the couples with dependent children there are children variables in the participation equation used to calculate the inverse Mill's ratio, and hence equation 6.9, that do not appear as regressors in the wife's hours equation. For couples without children age identification is achieved via functional form differences. In the wife's participation and wage equations her age and age squared enter as regressors. In the wife's hours equation age appears as a categorical dummy.

[4] The first year consequent on having a baby most women who have been working reduce their hours. In general this will result in a reduction in their wage, although in Australia it may well result in a wage increase if the woman moves from a permanent to a casual job. Consequently a dummy set to one is included in the wife's wage equation if the age of the youngest child is less than or equal to one.

In summary, the system of equations 6.7, 6.8 and 6.9 are estimated thus. Firstly a reduced form wage equation is estimated by OLS for wives who work (equation 6.11), correcting for sample selection bias as previously explained. Reduced form equations for husband's log wage and log hours are estimated by OLS. Then a reduced form wife's labour supply equation is estimated by tobit. In the second step, predicted values of the wives' log hours and log wages and the husband's log wage and log hours are used as instruments (replacing the observed values of the endogenous regressors) in single-equation estimations in order to obtain structural parameter estimates for the two equations of interest.

6.4 The Data

The selected samples from the Australia 1994, Canada 1994 and USA 1994 surveys, comprised couples in which the male partner was aged from 20 to 64 and a wage and salary earner, working full-time, full-year. He was not employed in the agricultural sector. The female partner, if working, was a wage and salary earner not working in the agriculture sector.

The country samples are split into two sub-samples, those with and without dependent children. *Figures 6.1* through *6.3* describe the distribution of hours worked by the wives in the paid labour market. The hours worked by wives proxied the couples' degree of specialisation. Wives were classified as working if they reported positive hours in the reference week. Note that when making comparisons across countries, Australian hours were top-coded so that all those who work more than 50 hours were classified as working 50 hours. Canadian hours were top-coded at 65.

In all countries wives without children were more likely to work. They were more likely to work full-time and less likely to work part-time than their counterparts with children. The difference in the propensity to be in full- time employment for wives with and without children was most marked in Australia.

In all countries a minority of wives worked part-time. Most of those part-time jobs were between 10 and 24 hours per week. Nonetheless one could not describe the distribution as bi-modal (not working or working full-time) since a substantial proportion of wives worked part-time. The proportion of part-time workers was highest in Australia and lowest in the USA. Dependent children appeared to have little effect on the US and Canadian tendencies to work part-time. In contrast Australian wives with dependents were far more likely to work part-time than those without. Conelly (1992) concluded that US women working full-time might be unwilling or unable to take the significant cut in income and benefits associated with part-time work. Furthermore, she suggests that part-time child-care can be more expensive and difficult to find.

For those working full-time, most Australian and Canadian wives worked from 35 to 44 hours per week, although a substantial proportion worked more than 44 hours per week. US wives worked longer weeks with most working from 40 to 44 hours per week. Amongst wives who worked full-time, the distribution of hours did not seem to vary substantially with the presence of children.

Table 6.1 lists the variables used in this study, with their sample means and standard deviations, by country. Gross hourly earnings measure the hourly wage. Women were regarded as wage earners for the purpose of estimating wages if they worked at least ten hours in the reference week and had positive annual earnings. The hourly wage was reported in the Australian data set. For the other countries I constructed the hourly wage as annual earnings divided by annual hours[5].

[5] Annual hours for husbands were calculated as hours worked in the reference week multiplied by weeks worked full-time in the last year. For females the calculation of annual hours is more complex. For those who worked at least 35 hours in the reference week annual hours are calculated as reference week hours multiplied by the number of weeks worked full-time. For those working less than 35 hours in the reference week but who have also reported working at least one week full-time in the previous year annual hours are 35 multiplied by weeks worked full-time plus (52 - weeks worked full-time) multiplied by hours worked in the reference week. For all others annual hours are reference week hours multiplied by 52.

Figure 6.1: Wives' Hours: Australia 1994

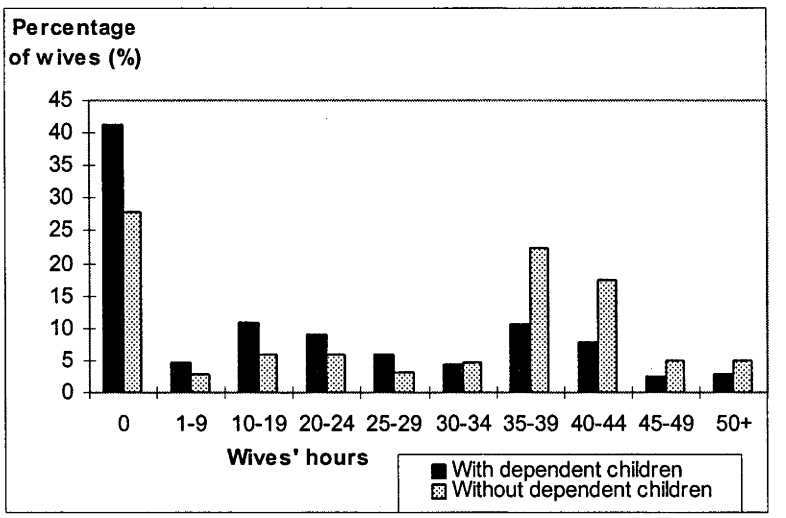


Figure 6.2: Wives' Hours: Canada 1994

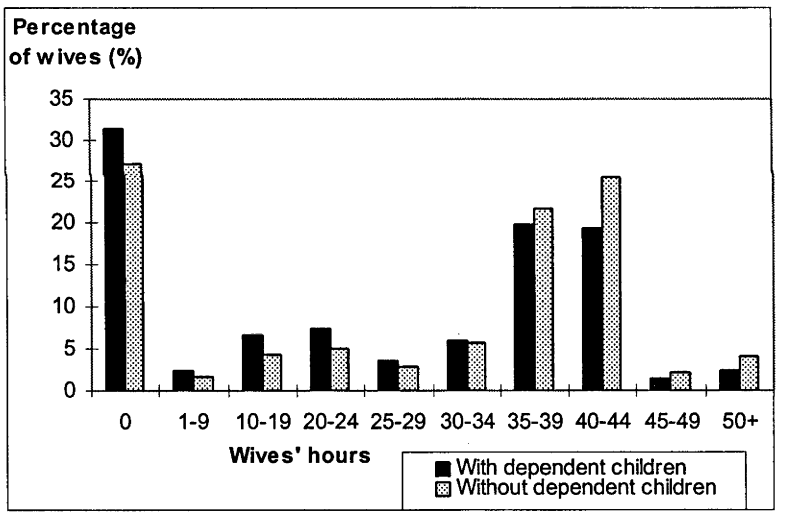
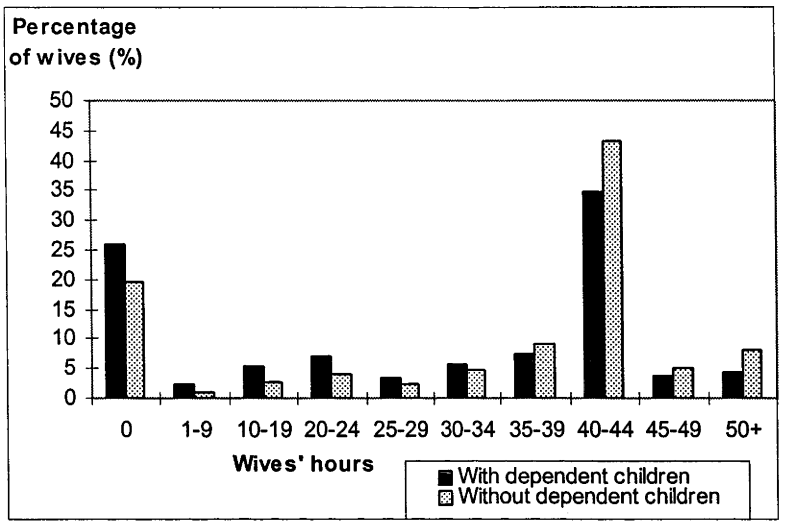


Figure 6.3: Wives' Hours: USA 1994



As *Table 6.1* shows, wives with dependent children worked fewer hours on average than those without. As the previous discussion of *Figures 6.1* through *6.3* revealed, this difference in average hours was primarily due to differing participation rates, although wives with children working part-time tend to work less hours per week than similar wives without children.

In Australia and Canada the average wage was higher for husbands with dependents than for those without. This could be due to differences in observed human capital, and not specialisation. Males with dependents were on average younger than those without in all countries. Only in Canada and Australia were fathers more educated than men without dependents.

Table 6.1: Variable means (standard deviations in brackets)

	Australia		Canada		USA	
	Without dependent child	With dependent children	Without dependent child	With dependent children	Without dependent child	With dependent children
Wives						
Log hourly wage of those working at least 10 hours per week	2.55 (0.39)	2.62 (0.43)	2.47 (0.61)	2.41 (0.69)	2.25 (0.71)	2.12 (0.85)
Log hours worked per week	2.50 (1.60)	1.85 (1.63)	2.55 (1.60)	2.33 (1.63)	2.89 (1.46)	2.56 (1.58)
Age dummies						
Less than 35 years	0.30	0.39	0.30	0.40	0.28	0.43
45 years plus	0.53	0.12	0.53	0.12	0.54	0.14
Education dummies:						
Bachelor degree or higher	0.12	0.15	0.16	0.16	0.26	0.24
Diploma, trade or apprenticeship	0.07	0.11	0.39	0.43	0.29	0.30
Secondary school	0.18	0.17	0.28	0.32	0.37	0.36
Ethnicity	0.25	0.25	0.13	0.11	0.06	0.06
Husbands						
Log hourly wage	2.71 (0.45)	2.77 (0.45)	2.87 (0.52)	2.90 (0.50)	2.69 (0.60)	2.67 (0.60)
Log hours worked per week	3.75 (0.12)	3.77 (0.12)	3.74 (0.14)	3.74 (0.14)	3.79 (0.16)	3.80 (0.16)
Age in years	44.32 (11.37)	39.20 (7.31)	44.60 (11.40)	38.81 (7.14)	44.71 (11.86)	38.40 (7.94)
Education dummies:						
Bachelor degree or higher	0.15	0.20	0.19	0.21	0.31	0.30
Certificate or Diploma	0.11	0.11	0.33	0.35	0.08	0.08
Trade or apprenticeship	0.31	0.30	0.06	0.07	0.18	0.19
Secondary school	N/A	N/A	0.24	0.27	0.33	0.32
Ethnicity	0.28	0.27	0.13	0.11	0.06	0.07

	Australia		Canada		USA	
	Without dependent child	With dependent children	Without dependent child	With dependent children	Without dependent child	With dependent children
Industry dummies:						
Mining	0.03	0.03	0.06	0.05	0.11	0.13
Manufacturing	0.21	0.21	0.26	0.26	0.26	0.27
Transport/communications/ utilities	0.14	0.13	0.13	0.15	.012	0.11
Construction	0.08	0.10	0.05	0.05	0.07	0.07
Wholesale/retail trade	0.17	0.17	0.13	0.14	0.16	0.17
Finance	0.11	0.12	0.05	0.04	0.04	0.04
Government	0.07	0.07	0.11	0.11	0.10	0.11
Community services	0.10	0.10	0.14	0.13	0.12	0.10
Urban	0.62	0.63	0.61	0.56	0.33	0.34
House owner	0.83	0.84	0.81	0.87	0.73	0.97
Log property income	4.07 (3.11)	3.34 (2.98)	2.67 (3.32)	2.16 (3.07)	4.84 (3.12)	3.94 (3.04)
Number of children < 18 years	N/A	1.99 (0.88)	N/A	1.88 (0.84)	N/A	1.91 (0.90)
Age of youngest child	N/A		N/A		N/A	
1 year old or less		0.20		0.21		0.23
2-4		0.22		0.20		0.20
5-10		0.32		0.30		0.30
11-12		0.10		0.09		0.08
Number of records	821	1226	3597	5646	6162	9815

6.5 Empirical Results

Firstly, I reported on whether or the size of the estimated premium differed with the presence of dependent children. I also tested whether the inclusion of men's hours in their wage equation affected the premium. Then I reported the results of estimating the model outlined in section 6.2. The first stage was to estimate the reduced form versions of the hours and wages equations for both husbands and wives. The second stage was to estimate the structural form of the equations of interest, wives' hours and husbands' wage.

6.5.1 Was the premium larger for men with dependent children?

The estimated coefficients from the OLS regressions for currently married and never married men are reported in *Appendix 6.B*. These equations included a separate marriage dummy for men with dependent children[6]. The estimated coefficient on the marriage dummy for men with dependent children was positive in all countries, but only significant (at the ten per cent level) in Canada. The marriage premium for Canadian men with dependent children was 11 per cent while the premium for men without dependent children was around 7.5 per cent. The US findings are inconsistent with Korenman and Neumark (1991) and Cornwell and Rupert (1997), who found that the US premium for men with dependent children was significantly higher. However, the data they used was from the late 1970s.

The inclusion of the log of husband's hours, and its square, as regressors had little effect on the size and significance of the estimated coefficients on the other regressors, including marital status. However it increased the explanatory power of the model in each of the countries under investigation. In Canada and the USA the relationship between the men's log wage and log of hours was concave, while

[6] Chapter Four also contains estimates of the marriage dummy for men with dependent children for these surveys. However the samples used for the Chapter Four estimations were different from those used in this chapter.

in Australia the relationship was convex[7]. The turning point for Australia was 44 hours, Canada was 26 hours, and the USA was 45 hours. So the estimated relationship between hours and wages was negative for all Canadian men working full-time, positive for Australian men working more than 44 hours per week and positive for US men working less than 46 hours per week.

It appears that the wage of Canadian husbands working full-time did not increase with hours worked. If specialisation played a role it would have to feed through the unobservable effort expended by husbands on the job. The productivity of Australian and US husbands does appear to increase with hours worked over some ranges.

6.5.2 The estimated reduced form equations

Female wages

The first stage was to estimate reduced form wage equations for working wives (equation 6.12) so as to instrument wages in the structural wives' hours equation. Instrumented wages were imputed for wives who were not working. The set of explanatory variables used for wives without dependent children was wife's education, husband's education, wife's age and age squared, wife's ethnicity, husband's ethnicity, the location and the inverse Mill's ratio[8]. The set of explanatory variables for wives with dependent children also included the number of dependent children and whether the couple had a baby. Estimation results for the wife's wage were in line with other comparable studies. The estimated

[7] The hours of Australian men are top-coded at 50 and the hours of Canadian men are top-coded at 65. I re-estimated the Canadian and US equations top-coding hours 50, but the estimated coefficients did not change substantially.

[8] The inverse Mill's ratio was constructed from the estimated coefficients of a probit regression of whether the wife was working. The set of explanatory variables included the wife's age and age squared, wife's education, log household property income, wife's ethnicity, husband's education, husband's ethnicity and location. For couples with dependent children the set also included the number of children and dummy variables describing the age of the youngest child.

coefficient on the inverse Mill's ratio was significant at the ten per cent level for US and Australian wives without children and Canadian and Australian couples with children; the signs were negative for those without children and positive for those with children[9].

Husbands' wages and husbands' hours

The husband's reduced form equations, for log hourly wage and hours, were estimated by OLS. The set of explanatory variables included education, ethnicity and age for the husband and wife, log of household property income, husband's industry of employment, log of household property income and whether the couple owned their home. The set for couples with dependent children also included the number of dependent children and the age of the youngest child.

While the estimated log wage models had good explanatory power, the estimated hours models had poor explanatory power in all countries. The adjusted R-squareds, in each country and sample, were less than 0.08.

Wives' Hours

The reduced form equation for wives' hours were estimated by tobit. They included as regressors all the variables listed for husbands' hours and wage equations.

One of the concerns of Chapter Five was that the explanatory power of the reduced form model for wives' hours was not strong enough. *Table 6.2* reports the correlation coefficients between predicted and actual log hours from each estimated equation. Instrument one is the linear combination of the estimated coefficients and the regressors. Instrument two is the model's predicted hours and instrument three is predicted hours assuming that the wife works.

[9] Until recently finding a negative coefficient was considered problematic. However Ermisch and Wright (1994) show that the coefficient can be negative if, given the observed characteristics of women (used to explain wage offers and reservation wages), the variance of wage offers is less than the covariance between wage offers and reservation wages. In other words unobserved attributes of women that raise their reservation wage also appear to raise their wage offers.

Table 6.2: Pearson's correlation coefficient for relationship between wives' actual and predicted log hours

Predicted hours	Australia		Canada		USA	
	With dependent children	Without dependent children	With dependent children	Without dependent children	With dependent children	Without dependent children
Instrument 1	0.40810	0.41958	0.29561	0.40723	0.30082	0.36885
Instrument 2	0.39947	0.41942	0.29802	0.40764	0.30074	0.36885
Instrument 3	0.39727	0.41928	0.29802	0.40783	0.30074	0.36885

Nowhere does the correlation coefficient exceed 0.45. As in Chapter Five the model seems better equipped to explain the hours worked of Australian women. In all countries the model works better for wives without dependent children, the difference in the explanatory power of equations for couples with and without dependents being least marked in Australia.

6.5.3 The estimated structural equations

Wives' Hours

The structural form equation for wives' hours was estimated by tobit. The estimated coefficients are reported in *Appendix 6.B*. *Table 6.3* summarises the estimated effects of husbands' hours and wages on wives' desired hours, listing the estimated coefficients and their significance[10].

Couples with dependents

The estimated relationship between exogenous husbands' wages and wives' hours was significant and negative, at the ten per cent level at least, in all countries.

[10] Estimated coefficients from Tobit estimation do not measure the effect on hours worked, given a change in the exogenous variable, for individuals who are working. McDonald and Moffitt (1980) show that the coefficient is the expected change in desired hours due to a unit change in the explanatory variable. To calculate the expected change in actual hours one must take account of the probability of having positive hours.

Table 6.3: The effect of husbands' wage and husbands' hours on wives' desired hours

	Australia		Canada		USA	
	With dependents	Without dependents	With dependents	Without dependents	With dependents	Without dependents
Exogenous						
Log husband's hours	0.100	0.384	0.017	-0.713**	-0.998*	0.092
Log husband's wage	-0.281**	0.031	-0.184*	-0.410*	-0.732*	-0.424*
Residual – log husband's hours	1.073	-2.078*	-0.808*	-0.899	-4.369*	-4.739*
Residual – log husband's wage	0.379**	-2.078*	1.167*	1.252*	2.612*	1.524*
Endogenous						
Log husband's hours-instrumented	N/A	2.974*	0.882*	N/A	3.635*	4.571*
Log husband's wage – instrumented	-0.675*	1.004*	-1.190*	-1.507*	-3.041*	-1.748*
Log wives' wage – instrumented	6.355*	-3.212*	3.327*	2.708*	7.413*	2.236*
Sample size	1226	821	5646	3597	9815	6162

* 5 per cent level of significance
** 10 per cent level of significance

This finding is consistent with the conventional view within economics of the wife as subsidiary earner. For example, amongst couples with dependents, a ten per cent increase in the wage of Australian husbands was accompanied by a 2.81 per cent decrease in desired hours of their wives. For wives working 25 hours per week this translates to about 40 minutes per week.

I tested for endogeneity by considering the significance of the residual, from reduced form estimation of the husbands' wage, when it was included as a regressor in the wives' structural hours equation. In all countries the residual was related significantly and positively to wives' hours. This implies that there were unobserved factors related positively to both husbands' productivity in the paid

labour market and the length of the wives' working week[11]. This suggests that couples may sort into marriage on the basis of similar desires for a career, or some unobserved career enhancing quality. The negative effect of the endogenised husbands' wage on wives' labour supply is larger than the exogenous effect. The 10 per cent Australian wage increase causes a reduction of one hour and 40 minutes in wives' desired weekly labour supply from 25 hours.

My estimates suggested that husbands' hours were endogenous in the wives' hours equation in Canada and the USA, although recall that the reduced form model for hours did not have much explanatory power. It appears that in Canada and the USA unobserved factors associated with the husband working longer full-time hours were also associated with the wives' desire to work a shorter week. This finding appears incongruous alongside the finding that there could be a positive correlation between unobserved factors, that enhance the husbands' productivity, and wives' desired hours. One explanation is that husbands and wives sort into marriage on the basis of unobserved career enhancing factors. Husbands believe that working longer full-time hours can make up for their lack of these unobserved career-enhancing factors.

The estimated effect of instrumented husbands' hours on wives' desired hours was positive for Canadian and US couples. Exogenous husbands' hours also had a positive impact on wives' desired hours amongst Australian couples. This could be a sign of couples sorting into marriage on the basis of education, for example. More educated couples would tend to be more focused on careers.

Couples without dependents

When exogenous the husbands' wage was related significantly and negatively to wives' desired hours in Canada and the USA. The relationship was positive but insignificant for Australian couples. The reduced form residual, from the

[11] Since there is no appreciable change in the sign and size of the coefficients on the other regressors from the regression in which the husband's wage was assumed exogenous the relationship appears to be between unobservable characteristics of the husband and unobservable, rather than observable, characteristics of the wife.

husbands' wage equation, proved to be related significantly to wives' hours in each of the countries. Amongst Canadian and US couples, the relationship was positive, as for couples with dependent children. However the Australian relationship was negative.

Following re-estimation allowing for endogeneity I found that the size of the negative relationship between husbands' wage and wives' desired hours increased in Canada and the USA. This was also the case amongst couples with dependents. However, amongst Australian couples wives responded to their husbands' increased earnings by wanting to work more hours.

Husbands' hours proved to be endogenous in the USA and Australia. The relationship between the reduced form residual and wives' hours was negative, as it was for US and Canadian couples with dependent children. Husbands' instrumented hours had a positive effect on wives' desired hours amongst Australian and US couples. In Canada the exogenous effect was negative and significant.

In terms of the estimated effects of husbands' hours and wages on wives' desired hours, it appears that the behaviour of couples was remarkably similar across countries and regardless of whether the couple had dependent children. Sorting into marriage appears to have been undertaken on the basis of complementarity in career intention and/or ability.

The Husband's Wage

Results of the estimation of the structural form of husbands' wage equation (equation 6.9), including wives' hours and husbands' hours as regressors appear in *Appendix 6.C.* The estimated coefficients, excluding both hours variables from the set of explanatory variables are reported in the first column. The estimated equations performed as expected. The wages of married men rose with education. The estimated relationship between age and the wage of married men was quadratic and concave. The coefficients on dummies set to one for those classified as migrants in Australia and non-French, non-English speakers in Canada were statistically significant and negative. Similarly the estimated

coefficients on the dummy set to one for non-whites in the US equations was significant and negative. Those living in capital cities in Australia and in heavily populated areas in Canada and the USA experienced wage premiums.

Adding the hours variables to the set of explanatory variables improved the explanatory power of the model, according to the adjusted R-squareds. The estimated coefficients are listed in the second columns of *Appendix 6.C.* The inclusion of the hours' variables did not affect the signs of the other coefficient estimates. Nor did it substantially affect the sizes of the other coefficient estimates. This suggests that the hours' variables were not related to the other explanatory variables.

Effect of wives' hours

Table 6.4 summarises the estimated effect of wives' hours on husbands' wage for each country depending on the presence of dependent children.

Couples with dependents

When exogenous the preferred estimated relationship between wives' hours and husbands' wages was significant and negatively linear for Canadian and US couples. In contrast, the preferred relationship for Australian couples was significant and concave downward. However the Australian relationship was negative amongst couples in which the wives worked more than five hours per week. The US findings were in line with the findings of Jacobsen and Rayack (1996) and Hotchkiss and Moore (1999).

I tested for the endogeneity of wives' hours in the husbands' wage equation by adding the residuals from estimation of wives' hours in its reduced form to the set of regressors. I followed Hotchkiss' and Moores' approach (1999: 413) and used three options to instrument the wives' labour supply, and hence three corresponding errors. The first option was the linear combination of the estimated coefficients from the tobit and the regressors. The second was expected hours given the coefficients and the regressors, and the third was expected hours conditional on a positive labour supply. I took most notice of the second option

and the residual calculated from its combination with actual hours worked appears in *Table 6.3*. Wives' hours proved to be endogenous for Canadian and US couples. For Australian couples the second and third option residuals were exogenous at the ten per cent level, but the first option was significant at the ten per cent level. I proceeded as if hours were exogenous.

Recall that the reduced form model was the best predictor of Australian wives' labour supply, as it was in the analysis presented in Chapter Five. The labour supply of Australian wives was also exogenous in Chapter Five's analysis. In Chapter Five I proceeded as if wives' hours were exogenous in all countries.

The observed negative relationship between the residual and husbands' wage could be evidence of a number of things. For example, wives might reduce their hours in response to increases in their husbands' earnings. Also, it is possible that a wife's unobservable desire for a career could impinge on her husband's productivity. Perhaps more career-oriented wives were less likely to move with their husbands for his promotional transfer (Jacobsen and Rayack, 1996).

These explanations are not necessarily in conflict with the conclusions of the previous section. It is likely that husbands and wives select into marriage on the basis of complementary desires for careers and/or education levels. But once married concessions may be made for the other partner's career.

The preferred specification for instrumented hours in Canada and the USA was the quadratic form. Like the findings for exogenous hours in Australia the relationships proved significant and concave. Amongst Canadian couples the relationship was negative once wives worked 11 hours, and amongst US couples the relationship was negative once wives worked 12 hours. Recall that the Australian relationship became negative once wives worked five hours. These findings provide support for the effects of specialisation on husbands' earnings.

Table 6.4 also shows the effect on husbands' wage of a ten per cent increase in wives' hours from two points, 35 hours and 15 hours. The negative impact of the increase from 35 hours on husbands' wage was remarkably similar in all countries in local currencies, ranging from eight Australian cents an hour to 13 Canadian

cents an hour. In Australia, for example, this translated to $166.40 over a full year. For wives working 15 hours the negative impact was somewhat smaller. Perhaps husbands are more likely to respond, or respond more markedly, to the increased demands on them to undertake work within the home when their wives are working full-time. Wives working full-time would be more time constrained themselves. It may also be the case that wives' attachment to the paid labour market is less indicative of the degree of specialisation because they are more easily able to combine work in the home with part-time work.

Couples without dependents

Among couples without dependents exogenous hours exhibited a negative relationship with husbands' wage in all countries, although that relationship was only significant in Canada and the USA. In all countries wives' hours proved to be endogenous. The relationship between the reduced form residual and husbands' wages was negative, as it was for couples with dependent children.

The estimated effect of the wives' instrumented hours on husbands' wage was significant, linear and positive in Australia and Canada. Although significant and concave downward in the USA it was positive for wives who worked less than 104 hours per week. These findings are the reverse of the findings for couples with dependent children. When wives currently working 35 hours per week increased their desired hours of work by ten per cent, the estimated increase in husbands' annual earnings ranged from $US104 in the USA to $Aus300 in Australia.

Jacobsen and Rayack (1996), Hotchkiss and Moore (1999) and Blackaby *et al* (1998) undertook similar analysis but split the samples on the basis of occupation rather than the presence of dependent children. Both Hotchkiss and Moore and Blackaby *et al* reported finding the wives' labour supply endogenous for men in some occupations. Furthermore, the wages of some men were detrimentally affected by their wives' attachment to the paid labour market.

Table 6.4: The estimated effect of wives' hours on husbands' wage

	Australia		Canada		USA	
	With dependents	Without dependents	With dependents	Without dependents	With dependents	Without dependents
Exogenous						
Log wives' hours	0.107*	-0.011	-0.018*	-0.011*	-0.028*	-0.018*
Log wives' hours squared	-0.032*					
Turning point – wives' hours	5.3					
Residual [R]	-0.026	-0.095*	-0.025*	-0.074*	-0.061*	-0.109*
Endogenous						
Log wives' hours – instrumented [I]		0.079*	0.152*	0.062*	0.216*	0.195*
Log wives' hours squared – instrumented			-0.039*		-0.043*	-0.021
Turning point – wives' hours			10.8		12.3	103.8
Mean of husbands' hourly wage in own-country $	14.32	15.07	18.23	17.82	15.86	14.88
Effect, in $, on husband's hourly wage of 10% increase in wife's hours from 35	-0.08	0.12	-0.13	0.11	-0.09	0.05
Effect, in $, on husband's annual earnings of above increase if husband working 40 hour week, 52 weeks per year	-166.40	299.60	-270.40	228.80	-187.20	104.00
Effect, in $, on husband's hourly wage of 10% increase in wife's hours from 15	-0.03	0.12	-0.06	0.11	-0.02	0.05
Sample size	1226	821	5646	3597	9815	6162

I Instrumented hours are the predicted hours from the reduced form tobit for wives' hours.
R The residual from instrumented hours set to expected hours conditional on a positive labour supply was also insignificant at the 10 per cent level. However the residual from instrumented hours set to the linear combination of the estimated coefficients and the regressors was significant at the 10 per cent level.
* 5 per cent level of significance

Effect of husbands' hours

As *Table 6.5* illustrates the relationship between husbands' hours and wages differed markedly from country to country. There was a significant relationship between exogenous hours and wages in both groups of couples in all countries. The relationship was linear and negative in Canada, regardless of the presence of dependent children. It was convex in Australia and concave in the USA. For both countries the turning points were around 45 hours. The hours worked by husbands proved to be endogenous for both sets of US couples and Australian and Canadian couples without children.

The preferred relationship between husbands' hours and wage rate was negative for at least a range of hours worked, in each country regardless of the presence of dependent children. The wage rate of Canadian husbands, regardless of the presence of dependent children, decreased as they worked more hours. The wage rate of Australian husbands without dependent children also decreased over all ranges of hours worked. But the wage rate of Australian husbands with dependent children varied inversely with the time spent working only up to 46 hours per week. Similarly, as US husbands increased their hours of work up to 39 hours per week for those with dependents and 46 hours per week for those without, their wage rate fell.

These results suggest that specialisation increased the wages of married men working full-time with dependent children in each of the countries. It appeared that specialisation did not operate through the time allocated to the paid labour market for Canadian husbands. If it operated this way for Australian and US husbands, it only did for Australian husbands working more than 46 hours per week and US husbands working more than 39 hours per week.

Table 6.5: The estimated effect of husbands' hours on husbands' wage*

	Australia		Canada		USA	
	With dependents	Without dependents	With dependents	Without dependents	With dependents	Without dependents
Exogenous						
Log husband's hours	-19.384*	-23.896*	-0.729*	-0.785*	8.817*	10.576*
Log husband's hours squared	2.572*	3.153*			-1.170*	-1.370*
Turning point – husband's hours	46	44			43	47
Residual	0.052	1.295*	0.168	1.525*	-2.940*	-1.071*
Endogenous						
Log husband's hours – instrumented		-1.473*		-2.291*	-67.390*	93.077*
Log husband's hours squared – instrumented					9.209*	-12.141*
Turning point – husband's hours					39	46

* Significant at the five per cent level.

6.6 Conclusion

Recent analyses of the labour supply of married women have assumed that the female's labour supply decision is inextricably linked to that of her husbands. His wage, an important determinant of female labour supply, however is presumed exogenous. I show that the male wage was endogenous for Australian, US and Canadian couples. In general it appears that these couples exhibit assortative mating in terms of unobservable factor(s) which jointly increase the husband's wage and the wife's degree of attachment to the paid labour market, as measured by her hours of paid work. Estimates of the effect of husbands' wage on wives' hours, that ignore this endogeneity, underestimate the size of the effect.

In estimating wage equations for married men I found that the number of hours worked in the labour market by their wives was endogenous for both sets of US

and Canadian couples and Australian couples without dependants. It is possible that unobserved factors that increase the female labour supply also generally decrease the male wage. Perhaps career mindedness in the female impinges on her husband's career. Also wives reduce their labour supply in response to increases in their husbands' earnings.

Once the male wage was endogenised I found evidence of specialisation amongst couples with dependents. However amongst couples without dependents increases in the wives' hours are actually associated with increases in their husbands' earnings.

The presence of children provides couples with the impetus to specialise. But once the children are old enough to live outside the parental home, my analysis suggests that specialisation ceases.

Appendix 6.A: Estimated coefficients from OLS regression of men's log wages (t-statistics in brackets): Australia 1994, Canada 1994, USA 1994

	Australia 1994		Canada 1994		USA 1994	
Constant	1.959	32.292	0.924	-5.667	0.324	-16.380
	(14.747)	(2.752)	(11.667)	(-1.961)	(5.791)	(-10.469)
Married	0.072	0.071	0.076	0.081	0.133	0.135
	(2.560)	(2.507)	(4.454)	(4.864)	(10.466)	(10.636)
Married with	0.034	0.034	0.030	0.030	0.011	0.012
children	(1.605)	(1.648)	(2.716)	(2.776)	(1.162)	(1.308)
Log husband's		-16.038		4.164		8.807
hours		(-2.571)		(2.776)		(10.993)
Log husband's		2.118		-0.638		-1.159
hours squared		(2.557)		(-3.281)		(-11.331)
Age	0.028	0.028	0.071	0.069	0.075	0.075
	(3.928)	(3.913)	(17.873)	(17.870)	(25.781)	(25.972)
Age squared	-3.00E-04	-3.00E-04	-7.13E-04	-6.97E-04	-7.30E-04	-7.33E-04
	(-3.450)	(-3.448)	(-14.845)	(-14.862)	(-20.796)	(-20.991)
Education dummies:						
Bachelor	0.341	0.342	0.405	0.430	0.707	0.719
	(14.396)	(14.340)	(24.118)	(26.221)	(52.031)	(52.574)
Certificate/	0.164	0.164	0.212	0.206	0.471	0.471
diploma	(5.709)	(5.679)	(13.713)	(13.689)	(26.690)	(26.852)
Post-	0.022	0.023	0.163	0.164	0.387	0.394
secondary	(1.100)	(1.136)	(7.484)	(7.722)	(26.334)	(26.924)
Secondary	N/A	N/A	0.113	0.110	0.288	0.290
			(7.003)	(6.991)	(21.278)	(21.565)
Location	0.022	0.021	0.075	0.066	0.136	0.134
	(1.239)	(1.174)	(7.755)	(7.001)	(17.057)	(16.989)
Ethnicity	-0.071	-0.071	-0.130	-0.131	-0.152	-0.154
	(-3.709)	(-3.714)	(-9.211)	(-9.527)	(-10.367)	(-10.561)
Adjusted R squared	0.1184	0.1206	0.1529	0.1959	0.2766	0.2862
Number of records	2462	2462	10 316	10 316	18 864	18 864

Appendix 6.B: Estimated coefficients from tobit regression of wives' hours - (chi statistics in brackets): Australia 1994, Canada 1994, USA 1994

A. Australia

	With dependents		Without dependents	
	Independent	Simultaneous	Independent	Simultaneous
Constant	-12.093	-11.151	9.683	-2.479
	(197.507)	(132.416)	(144.637)	(0.580)
Education dummies:				
Tertiary	-2.142	-2.075	1.305	1.055
	(560.651)	(473.863)	(271.675)	(159.436)
Certificate/Diploma*	-1.087	-1.061	1.151	0.988
	(148.875)	(137.261)	(136.965)	(102.248)
Secondary	-0.378	-0.339	0.447	0.441
	(26.528)	(19.955)	(45.444)	(47.139)
Urban	-0.263	-0.244	0.204	0.177
	(22.549)	(18.554)	(15.079)	(12.104)
Log property income	0.038	0.456	0.004	-0.023
	(17.910)	(22.228)	(0.264)	(6.697)
Log wives' wage	6.363 [I]	6.355 [I]	-3.205 [I]	-3.212 [I]
	(3308.181)	(3280.327)	(3153.983)	(3344.894)
Log husband's wage	-0.281	-0.675 [I]	0.031	1.004 [I]
	(22.477)	(12.586)	(0.309)	(38.303
Log husband's hours	0.100	0.130	0.384	2.974 [I]
	(0.218)	(0.364)	(3.410)	(11.749)
Ethnicity	0.456	0.456	-0.197	-0.132
	(51.741)	(51.313)	(11.462)	(5.279)
Number of children	-0.076	-0.074		
	(5.623)	(5.341)		
Youngest child aged to one	-0.592	-0.590		
	(72.367)	(71.427)		
Youngest child aged 2-4	-0.401	-0.420		
	(31.797)	(33.964)		
Number of records	1226	1226	821	821
Log Likelihood	-1059.460	-1064.392	-707.820	-684.701

* This includes post-secondary.
[I] Instrumented

B. Canada

	With dependents		Without dependents	
	Independent	Simultaneous	Independent	Simultaneous
Constant	-3.315	-3.882	0.841	0.593
	(99.787)	(5.987)	(0.582)	(0.300)
Education dummies:				
Tertiary	-1.749	-1.464	1.428	1.107
	(1036.972)	(630.675)	(69.267)	(38.254)
Certificate/Diploma*	-0.752	-0.588	1.388	1.257
	(271.256)	(166.166)	(137.234)	(109.905)
Secondary	-0.249	-0.142	1.210	1.195
	(29.927)	(9.902)	(111.903)	(109.970)
Urban	-0.495	-0.380	-0.012	-0.029
	(441.414)	(257.550)	(0.024)	(0.141)
Log property income	-0.014	0.007	-0.017	0.011
	(13.743)	(3.478)	(2.495)	(0.966)
Log wives' wage	3.315 [I]	3.327 [I]	1.731 [I]	2.708 [I]
	(17111.07)	(18240.12)	(49.516)	(83.045)
Log husband's wage	-0.184	-1.190 [I]	-0.410	-1.507 [I]
	(59.855)	(355.866)	(32.514)	(56.982)
Log husband's hours	0.017	0.882 [I]	-0.713	-0.427
	(0.0446)	(4.472)	(7.636)	(2.878)
Ethnicity	0.249	0.116	-0.190	-0.222
	(52.165)	(11.636)	(3.190)	(4.371)
Number of children	0.081	0.107		
	(35.116)	(61.266)		
Youngest child aged to one	0.039	-0.069		
	(1.835)	(5.746)		
Youngest child aged 2-4	0.446	0.293		
	(219.544)	(93.458)		
Number of records	5646	5646	3597	3597
Log Likelihood	-5231.207	-5078.307	-6550.767	-6538.545

*This includes post secondary.
[I] Instrumented

C. USA

	With dependents		Without dependents	
	Independent	Simultaneous	Independent	Simultaneous
Constant	-2.032	-16.839	1.278	-15.110
	(15.502)	(33.954)	(4.478)	(17.919)
Education dummies:				
Tertiary	-4.438	-4.988	0.742	-0.096
	(750.111)	(886.170)	(20.378)	(0.301)
Certificate/Diploma*	-1.812	-2.005	0.772	0.355
	(309.978)	(356.727)	(43.800)	(8.798)
Secondary	-1.055	-1.100	0.423	0.141
	(152.893)	(164.289)	(16.563)	(1.800)
Urban	-1.360	-1.188	-0.317	-0.288
	(765.612	(576.073)	(30.718)	(25.248)
Log property income	0.017	0.134	-0.012	0.050
	(5.632)	(209.018)	(2.325)	(20.294)
Log wives' wage	6.017 [I]	7.413 [I]	1.151 [I]	2.236 [I]
	(1667.21)	(2206.356)	(44.590)	(124.734)
Log husband's wage	-0.732	-3.041 [I]	-0.424	-1.748 [I]
	(380.005)	(788.536)	(100.536)	(219.453)
Log husband's hours	-0.998	3.635 [I]	-0.092	4.571 [I]
	(71.908)	(21.724)	(0.412)	(22.801)
Ethnicity	0.453	0.269	-0.151	-0.150
	(34.815)	(11.363)	(2.515)	(2.170)
Number of children	-0.015	0.108		
	(0.482)	(24.670)		
Youngest child aged to one	0.211	0.156		
	(18.114)	(10.165)		
Youngest child aged 2-4	0.023	-0.201		
	(0.193)	(14.184)		
Number of records	9815	9815	6162	6162
Log Likelihood	-17146.486	-16960.421	-11197.447	-11120.404

*This includes post secondary.
[I] Instrumented

Appendix 6.C: Estimated coefficients from OLS regression of husbands' log wages (t- statistics in brackets): Australia 1994, Canada 1994, USA 1994

A Australia

	With dependents			Without dependents		
		Independent	Simultaneous		Independent	Simultaneous
Constant	2.724	39.213		1.848	47.111	7.217
	(9.001)	(2.266)		(8.239)	(2.228)	(3.343)
Log wives' hours		0.107			-0.011	0.079 [I]
		(2.653)			(-1.141)	(2.326)
Log wives' hours squared		-0.032				
		(-2.790)				
Log husband's hours		-19.384			-23.896	-1.473 [I]
		(-2.108)			(-2.126)	(-2.535)
Log husband's hours squared		2.572			3.153	
		(2.107)			(2.111)	
Age	-0.008	-0.008		0.039	0.039	0.032
	(-0.529)	(-0.511)		(3.470)	(3.512)	(2.706)
Age squared	1.67E-04	1.65E-04		-4.35E-04	-4.48E-04	-2.96E-04
	(0.846)	(0.834)		(-3.320)	(-3.410)	(-1.987)
Education dummies:						
Bachelor	0.303	0.300		0.394	0.404	0.420
	(8.858)	(8.669)		(8.715)	(8.892)	(8.271)
Certificate/Diploma	0.159	0.152		0.170	0.170	0.170
	(3.784)	(3.622)		(3.318)	(3.322)	(3.228)
Post-secondary	0.011	0.010		0.022	0.021	-0.003
	(0.352)	(0.336)		(0.618)	(0.586)	(-0.079)
Urban	0.038	0.037		0.007	0.003	0.006
	(1.443)	(1.403)		(0.215)	(0.103)	(0.177)
Ethnicity	-0.047	-0.039		-0.105	-0.105	-0.131
	(-1.630)	(-1.358)		(-3.091)	(-3.086)	(-3.756)
Adjusted R squared	0.0826	0.0889		0.1068	0.1119	0.1154
N° of records	1 226	1 226	1 226	821	821	821

[I] Instrumented

B. Canada

	With dependents			Without dependents		
		Independent	Simultaneous		Independent	Simultaneous
Constant	1.223	4.029	3.918	0.792	3.748	9.426
	(8.818)	(18.905)	(18.200)	(6.481)	(15.170)	(5.829)
Log wives' hours		-0.018	0.152 [I]		-0.011	0.062 [I]
		(-4.882)	(4.478)		(-2.038)	(4.022)
Log wives' hours squared			-0.039 [I]			
			(-4.285)			
Log husband's hours		-0.729	-0.717		-0.785	-2.291 [I]
		(-17.076)	(-16.791)		(-13.635)	(-5.336)
Log husband's hours squared						
Age	0.061	0.060	0.056	0.081	0.082	0.069
	(8.670)	(8.735)	(7.869)	(13.720)	(14.154)	(10.555)
Age squared	-5.98E-04	-5.92E-04	-5.35E-04	-8.26E-04	-8.47E-04	-6.59E-04
	(-6.745)	(-6.843)	(-6.043)	(-11.952)	(-12.431)	(-8.195)
Education dummies:						
Bachelor	0.424	0.443	0.425	0.411	0.447	0.467
	(18.113)	(19.391)	(18.279)	(15.036)	(16.664)	(14.379)
Certificate/Diploma	0.218	0.206	0.190	0.191	0.192	0.172
	(10.057)	(9.715)	(8.878)	(7.880)	(8.109)	(7.055)
Post-secondary	0.151	0.150	0.136	0.176	0.183	0.147
	(5.114)	(5.200)	(4.660)	(4.671)	(4.988)	(3.836)
Secondary	0.117	0.111	0.097	0.010	0.103	0.082
	(5.207)	(5.064)	(4.339)	(3.888)	(4.115)	(3.152)
Urban	0.082	0.078	0.074	0.077	0.070	0.064
	(6.484)	(6.331)	(5.868)	(4.574)	(4.237)	(3.770)
Ethnicity	-0.158	-0.163	-0.158	-0.103	-0.103	-0.095
	(-8.452)	(-8.953)	(-8.619)	(-4.258)	(-4.366)	(-3.894)
Adjusted R squared	0.1442	0.1886	0.1879	0.1498	0.1918	0.1591
Number of records	5646	5646	5646	3579	3579	3579

[I] Instrumented

C. USA

	With dependents			Without dependents		
		Independent	Simultaneous		Independent	Simultaneous
Constant	0.246	-16.323	123.356	0.473	-19.855	-178.007
	(2.566)	(-7.686)	(2.941)	(4.973)	(-7.052)	(-2.708)
Log wives' hours		-0.028	0.216[I]		-0.018	0.195[I]
		(-8.589)	(5.902)		(-3.677)	(2.533)
Log wives' hours squared			-0.043[I]			-0.021[I]
			(-5.071)			(-1.490)
Log husband's hours		8.817	-67.388[I]		10.576	93.066[I]
		(8.118)	(-3.052)		(7.334)	(2.681)
Log husband's hours squared		-1.170	9.209[I]		-1.370	-12.141[I]
		(-8.441)	(3.171)		(-7.434)	(-2.650)
Age	0.085	0.087	0.077	0.074	0.075	0.060
	(17.337)	(17.977)	(15.273)	(16.045)	(16.326)	(11.285)
Age squared	-8.83E-04	-9.11E-04	-7.49E-04	-7.00E-04	-7.21E-04	-4.92E-04
	(-14.399)	(-15.018)	(-11.905)	(-13.033)	(-13.404)	(-7.339)
Education dummies:						
Bachelor	0.785	0.813	0.517	0.644	0.651	0.520
	(43.522)	(44.877)	(18.201)	(25.682)	(25.830)	(16.490)
Certificate/Diploma	0.517	0.533	0.404	0.402	0.406	0.316
	(22.121)	(22.996)	(15.171)	(12.614)	(12.791)	(9.312)
Post-secondary	0.436	0.464	0.257	0.320	0.326	0.234
	(22.609)	(24.125)	(9.867)	(11.850)	(12.112)	(8.055)
Secondary	0.320	0.339	0.212	0.244	0.246	0.184
	(18.013)	(19.162)	(9.771)	(9.852)	(9.964)	(7.072)
Urban	0.154	0.145	0.159	0.128	0.125	0.141
	(14.331)	(13.630)	(14.422)	(8.885)	(8.710)	(9.438)
Ethnicity	-0.167	-0.162	-0.096	-0.142	-0.140	-0.075
	(-8.310)	(-8.124)	(-4.292)	(-5.111)	(-5.057)	(-2.337)
Adjusted R squared	0.2939	0.3120	0.3073	0.2301	0.2394	0.2370
Number of records	9815	9815	9815	6162	6162	6162

[I] Instrumented

CHAPTER SEVEN

CONCLUSION

This thesis considers whether married men earn more than unmarried men do because of the productivity enhancement of traditional sex-based specialisation within marriage, wherein married women are responsible for work within the home and married men focus their energy on work in the paid labour market. Empirical analysis of three waves of cross-sectional Australian, Canadian and US data spanning the 1980s and the first half of the 1990s forms the basis of the thesis. The brunt of the analysis rests on the assumption that a couple's degree of specialisation varies inversely with the extent of the wife's attachment to the paid labour market.

The analysis commences with a survey of the literature relevant to an economics based discussion of the male marriage premium. Included in the discussion is a brief review of the economic theory underpinning the relationship between specialisation within marriage and male wages, Gary Becker's theory of the family (for example Becker, 1981, 1985). Becker's depiction of the family as a locus of production made it easier for economists to study families and incorporate gender relations into economic theory. He suggested that the organisation of family life had repercussions for labour market outcomes. Also discussed is the validity of the assumption that couples are less likely to specialise as the wife spends more time in the paid labour market.

Claiming that married men are more productive than are never married men, recent economics based literature has focused on using US panel data to determine the relative importance of two competing explanations for the productivity differential; specialisation and selection into marriage. Selection supposes that marriage does not make men more productive, rather the factors that make them more productive, like reliability and commitment, also make men more marriageable. These factors are life-long attributes. Panel data is used to wash out the effect on men's wages of these life-long productivity-enhancing attributes.

This thesis' comparison of cross-sectional data from Australia, Canada and the USA, three very similar countries, broadened the focus of the marriage premium literature. The analysis presented in this thesis used the fact that the size of the marriage premium varies between countries and that the relative sizes changed over time, to test the validity of specialisation as a cause of the marriage premium.

There are two parts to the empirical analysis. Chapters Three and Four served to describe the empirical relationships between the marriage premium and factors relevant to specialisation, such as the wives' labour supply, the presence of dependent children and the length of the marriage. In the analysis, presented in Chapters Five and Six, specialisation was proxied only by the wives' labour supply and attention was focused on the relationship between the wages of married men and the labour supply of their wives. In the earlier chapters the length of marriage was proxied by the age of the men. With the trend to delay marriage and the increasing likelihood of marital breakdown the link between a man's age and the length of time he has spent in a stable relationship is more tenuous. And it proved difficult to establish a hypothesis about the effect of dependent children on the likelihood of specialisation. The analysis presented in Chapters Five and Six considered the possibility that the wife's labour supply was endogenous in equations describing husband's earnings. Chapter Six also estimated the relationship between husband's earnings and wives' labour supply separately for couples with and without dependent children, thus allowing for any effects parenthood and/or stage in life-course might have on the specialisation process.

Assuming that a married man's age is a rough guide to the length of time he has spent married the age wage profiles presented in Chapter Three provide a simple, but effective, introduction to the effects of specialisation on men's earnings. The chapter contains, for each country and time period, a figure of age-wage profiles for unmarried men and married men grouped by whether their wife worked or not. Cross-national comparison was undertaken with Australia 1989, Canada 1991 and the USA 1991. Over-time comparison was undertaken with Australia 1981 and 1994,

Canada 1981 and 1994 and the USA 1979 and 1994. Hypotheses were made about cross-national and over-time differences in the extent of specialisation. These differences could have been borne out in the age-wage profiles.

However age-wage profiles do not control for differences between married and unmarried men in their holdings of observed human capital. Married men tend to be older and less educated than unmarried men are. There could have been cross-national differences and over-time differences in the relative holdings of observed human capital and the returns to observed human capital. Estimated marriage premiums, derived from human capital theory based OLS regressions of male earnings that controlled for differences in observed human capital, were presented in Chapter Four. They gave some indication of the ability of specialisation to account for the marriage premium across countries and over time.

Chapter Five reported on the findings of Juhn *et al.* decompositions of the dynamics of cross-national differences in the wage gaps between married men (grouped by whether their wives worked full-time, part-time or not at all) and unmarried men. The Juhn *et al.* decomposition technique was used to identify the extent of and return to specialisation based human capital. The logic behind this test of specialisation was that the US marriage premium was larger in size than the Australiana and Canadian premiums in both the second and third waves of the data sets. However, between the second and third waves the US premium advantage over Canada increased in size, while the US advantage over Australia decreased in size. If specialisation was a useful explanator of the marriage premium, cross-national changes in the relative extent of and return to specialisation should have been able to explain the over-time movement in the size of the US premiums relative to the Australiana and Canadian premiums.

This test of specialisation was performed with the assumption that the wives' labour supply was exogenous in the husbands' earnings equation. In other words it was assumed that wives did not take into account their husbands' earnings when determining their labour supply. The analysis also assumed that, for example,

husbands and wives did not select into marriage on the basis of unobserved characteristics related to their labour market outcomes. I did test whether wives' labour supply was endogenous. However the instruments were such poor predictors of the wives' labour supply that I assumed the test of endogeneity was unreliable.

Using the third wave of data, the analysis presented in Chapter Six sets out to determine whether the wives' labour supply was endogenous. Wives' labour supply, in hours worked, appeared as a continuous variable and the couples were split into those with and without dependent children.

The Main Findings

This thesis is devoted to determining the worth of the claim that the male marriage premium has a base in theory, specifically specialisation within marriage.

The marriage premium exists in Australian, Canadian and US cross-section data

Analysis presented in Chapter Four suggested that, in log hourly wage equations, estimated by OLS, currently married men earned more than unmarried men after controlling for age, education, ethnicity and location, in all countries at three points in time from the early 1980s to the mid 1990s – Australia (1981, 1989, 1994), Canada (1981, 1991, 1994), and USA (1979, 1991, 1994)

Cross-country comparison, with the most comparable data sets, in terms of samples and variables, revealed that the marriage premiums for men working full-time for the entire surveyed year were 8.5 per cent, 15.3 per cent and 17.1 per cent respectively in Australia 1989, Canada 1991 and the USA 1991.

I also presented over-time comparisons of the marriage premiums in Chapter Four. I found that the size of the Canadian and Australian marriage premiums fell over the 1980s and early 1990s (between the first and third waves) by roughly 40 per cent and sixty per cent respectively. However the US premium was much the same size in the 1994 and 1979 data sets. In contrast, other studies found that the size of the US

premium had fallen over the same period (Blackburn and Korenman, 1994; Gray, 1997). It is possible that data limitations, which affected the comparability of the wage data between the 1994 and 1979 data sets, and forced me to include men in de-facto relationships and divorced, widowed and separated men with never married men, could have caused this difference.

How important was specialisation to cross-national differences in the marriage premium and the dynamics of those differences?

In Chapter Three I set out some hypotheses to explain cross-country and over-time differences in the extent of specialisation. In terms of the cross-country comparison these hypotheses suggested that the least amount of specialisation would be undertaken in Australia, and indeed analysis presented in Chapter Four showed that the Australian marriage premium was the smallest in size. Australian women face the least amount of sex-based pay discrimination In terms of this aspect of the opportunity cost associated with specialisation, Australian couples should have been the least motivated to specialise.

On the bases of these hypotheses I would have expected the Canadian and US premiums to be of much the same size, even though my estimates suggested that the US premium was larger.

The hypotheses suggested that the motivation for Australian and US couples to specialise should have decreased over the 1980s. Both countries experienced reductions in sex-based wage discrimination during the 1980s. Also the average length of time spent married decreased over the same time. Furthermore attitudes to gender roles continue to evolve. In line with this prediction the size of the Australian marriage premium, reported in Chapter Four, fell between 1981 and 1994. However the size of the US marriage premium was much the same in both periods. I have already mentioned that the US estimates may have been compromised by data comparability problems. However, it is possible that the return to the specialisation

related human capital increased sufficiently over the same period to cancel out the fall in the amount of specialisation.

I hypothesised that there would be no change in the extent of specialisation in Canada. Over the 1980s there was no change to the extent of sex based pay discrimination. Nor did Canadian men seem to spend less time married. However the size of the Canadian premium fell.

The size of the male marriage premium increased with the couple's degree of specialisation, measured by the labour supply of the wives, in each of the countries in the early to mid 1990s.

Analysis presented in Chapter Five showed that amongst men working full-time full-year the size of the male marriage premium varied with the wife's degree of attachment to the paid labour market, acting as proxy for the degree of specialisation in the couple. Men with wives who did not work had the largest premiums, followed by men with wives who worked part-time. Men with wives who worked full-time received the smallest premiums. However the differences in the sizes of the premiums disaggregated by the wife's employment status were not always statistically significant. In the 1994 US and Canadian samples[1] I found no statistical difference (at the five per cent level) between the size of the premiums of men with wives who worked part-time and men with wives who did not work. In the 1991 Canadian sample the difference between the premiums of men with wives who worked part-time and men with wives who worked full-time was not statistically significant.

These results were based on OLS estimation of human capital theory based equations explaining the log hourly wages of men. Wives' labour supply entered the regression as an exogenous explanatory variable. However there are concerns that wives' labour

[1] I was not able to identify men who worked full-year in the Australian 1994 data set so the sample of men included all men who worked full-time in the reference week.

supply is endogenous, and that the observed inverse relationship between wives' labour supply and husband's earnings might not reflect the effects of specialisation on husband's productivity. Perhaps wives adjust their desired hours of work in response to their husband's earnings. When he is seen as the primary income earner, as his earnings increase there is less need for the wife to work. Also couples might select into relationships on the basis of characteristics crucial to their labour market outcomes, but unobservable to the analyst.

Was the wife's labour supply endogenous?

In the analysis undertaken for Chapters Five and Six I tested empirically for the possibility that the wives' degree of attachment to the paid labour market was endogenous in the husband's wage equation. I could not find adequate instruments to describe whether wives worked full-time, worked part-time or did not work in Canada and the USA. The Australian instruments were more effective, and I found that the labour supply of Australian wives was exogenous.

In the analysis undertaken for Chapter Six, I also instrumented wives' continuous hours. Here I found that the available instrument was best able to explain the hours worked by Australian women, although even in Australia the degree of correlation between wives' actual hours and instrumented hours was less than 0.5. In all countries the instrument was better able to explain wives' hours if the couple did not have dependent children, although the instrument did contain information on the number and age of the dependent children. It is difficult to judge whether I was better able to instrument continuous hours than segmented hours. Nonetheless I concluded that wives' hours were exogenous for Australian couples with dependents, but endogenous for other Australian couples and all Canadian and US couples, regardless of the presence of dependent children.

It seems that unobserved factors, which were positively related to the labour supply of married women, were also related negatively with the husband's wage. This finding is consistent with a number of explanations. Estimation of the wives' hours

equation showed that wives did tend to withdraw their labour from the paid labour market the more their husband earned, regardless of whether they were parents. It is also possible that the wife's unobserved taste for her career had a detrimental effect on her husband's career. She may have been less able to move with her husband for his promotional transfer. Estimation of the wives' hours equation suggested that men and women select into couples on the basis of career intentions. Unobserved factors that enhance husband's earnings potential are also associated with the wife spending more hours in the paid labour market, again regardless of whether the couple has dependent children.

Was there evidence of specialisation once the wife's labour supply was endogenised?

I found evidence for specialisation amongst couples with dependent children only.

Amongst couples without dependents the estimated relationships between wives' instrumented hours and the husband's wage suggested that husband's earnings increased with wives' hours. It is possible this signals that husbands and wives tend to select into marriage on the basis of observed human capital, like education. There was some indication that the positive effect of wives' instrumented hours on husband's earnings absorbed some of the positive effect of his own education and work experience on his earnings, especially in Canada and the USA.

Wives' hours proved to be endogenous amongst couples with dependent children from Canada and the USA. Once instrumented wives' hours had a significant concave downward effect on husband's wage. The Australian exogenous effect was similarly concave. In all countries the relationship proved to be negative for most of the working wives, the turning points were five hours, eleven hours and twelve hours for the Australian, Canadian and US couples respectively.

The negative effect on the husband's annual earnings of wives increasing their hours of work by ten per cent from 35 hours ranged from $166 in Australia to $270 in Canada. For wives working fifteen hours the estimated impact was significantly

smaller, implying, as one would imagine, that wives working full-time are more time constrained than wives working part-time.

Was specialisation able to explain the dynamics of cross country differences in the size of the male marriage premium between the second and third waves?

In analysis presented in Chapter Five, the Juhn *et al.* decomposition technique was used to decompose dynamics in the cross-country wage gaps between never married men and currently married men (grouped by whether their wives worked full-time, worked part-time, or did not work). Based on the assumption that all unobserved human capital was the result of specialisation this decomposition technique was used to identify holdings of specialisation related human capital and the return to that human capital. Once identified these values were compared to the dynamics of the cross-country differences in the size of the disaggregated marriage premiums.

The disaggregated marriage premiums were largest in the USA and smallest in Australia in both waves. US married men appeared to hold more specialisation related human capital than Canadian and Australian men in both waves. The US return to that human capital was larger than the Australian return and much the same size as the Canadian return. Over the early 1990s the size of the disaggregated US premiums fell, that fall being most marked for couples with dependent children. It seems that holdings of specialisation related human capital and the return to that human capital fell over the same time frame. Over the same time the return to observed human capital increased. Claims by other researchers that the return to specialisation related human capital also increased between the early 1970s and early 1990s (Gray, 1997; Blackburn and Korenman, 1994) appear to be unfounded. Blackburn and Korenman based their claim on increases in the return to years married and Gray based his claim on an increased intensity in the inverse relationship between wives' hours of paid work and husband's earnings. Both ignored the possibilities that there had been changes over time in: the amount of specialisation undertaken per year of marriage, and the mapping from degree of specialisation to wives' labour supply.

Over the early 1990s the US premium advantage over Australian men decreased somewhat, a trend consistent over all married men regardless of their wives' employment status. There was a marked reduction in the US advantage in the holdings of specialisation related human capital, although the Australian and US returns to specialisation related human capital both fell by much the same extent.

Over the early 1990s the fall in the size of the Canadian premiums was more extreme than the US fall. But US holdings of specialisation related human capital fell, relative to Canadian holdings, and there was little change in the relative returns to specialisation related human capital. So specialisation changes cannot be said to explain the relative movements in the Canadian and US marriage premium.

Practical Relevance and Suggestions for Future Research

That marital status appears as a regressor in men's human capital based wage equations, without having an unambiguous theoretical source, is reason enough to undertake an analysis that helps to uncover that source. The identification of the source of the male marriage premium also matters for our understanding of marriage, for example. Marriage involves a complex web of interdependencies. Some social scientists argue that specialisation within marriage is a dying phenomenon as the roles of husbands and wives have become more similar since the 1950s and 1960s. Furthermore, the gains from marriage arise from comparable, rather than dissimilar, economic and household roles.

The analysis also has implications for how we think about sex discrimination in the paid labour market. In industrialised countries the push for equal pay for work of equal value has been largely successful. However, as Morris explains, the work force is not a friendly place for dual career couples especially those with children.

> More and more, the business world seems to regard children not as a future generation of workers but as luxuries you're entitled to after you've won your stripes. It's fine to have the kid's picture on your desk – just don't let them cut into your billable hours (Morris, 1997: 70).

The family 'un-friendly' nature of the structure of paid work and the labour market plus the lack of institutional support for parents engaged in paid work make it difficult for women to meet their career goals. Hence institutional factors feed indirectly into discrimination. They also discourage men from contributing more equally to work within the home, an outcome that would alleviate the double-burden of women's working lives. If, as Becker argues, our happiness depends on the consumption of goods and services produced within the home the most valuable institutional changes would enable both members of married couples to work more effectively in the paid labour market without being detrimental to household production.

The research presented in this thesis provides some support for the claim that sex-based specialisation within the family boosts men's earnings. In Chapter Five I showed that changes in the relative amounts of specialisation and the return to that specialisation had implications for the dynamics of the US male marriage premium over the early 1990s. Specialisation was also able to explain much of the dynamics of the Australian premium relative to the US premium over that period.

The research underpinning Chapter Six suggested that the average married couple with children in Australia, Canada and the USA, was specialised to some extent. The effect of specialisation on husband's earnings was most extreme in Canada and least extreme in Australia. The relative effects of specialisation did not match the relative sizes of the marriage premium perfectly. Recall that the US premium was the largest over the 1980s and early 90s, and the Australian the smallest. Similarly the finding was only partially consistent with hypotheses on the relative extent of specialisation, discussed in Chapter Three. For example, Australia exhibits the least amount of sex-based pay discrimination and the USA, probably the most. Sex-based pay discrimination encourages specialisation.

Future Research

The specialisation hypothesis better described the experiences of Australian and US families, than it did Canadian families. In the analysis cross-country institutional differences were largely ignored. That Canada stood out from the other two countries provides a basis for introducing institutional factors into the analysis. They could have important implications for the couples' desired trade-off between home production and market work and the ability of people to combine market work with home-production, for example.

Non-economists are far more likely to research how people use their time than economists. Time use is a critical element of Becker's theory of the family. Economic research into marriage this area would benefit from combining time-use surveys with labour-market surveys. In the better time-use surveys, such as the Australian one (Australian Bureau of Statistics, 1997), it is possible to approximate both the time spent in and the intensity of home production.

One of the most important legacies of Becker's theory of the family is that it has allowed economists to pose questions, considered important by other social scientists. This facilitates cross-fertilisation of ideas. The economic literature surrounding the source of the male marriage premium is relatively young. It has the potential to be diverse in its theoretical content. Future research would benefit greatly from blending the strict economic picture of the interface between the family and the labour market with views of other social scientists.

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